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MTIC

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DIRECTORY OF MANUFACTURING RESEARCH CENTERS

June 1989

Manufacturing Technology Information Analysis Center
10 West 35th Street
Chicago, Illinois 60616
312/567-4730

A Department of Defense Information Analysis Center

Manufacturing Technology
MTIAC
Information Analysis Center

MTIAC Operations
Cresap, a Towers Perrin Company
10 West 35th Street
Chicago, Illinois 60616
(312) 567-4730

March 19, 1990

DTIC-FDA
Document Processing Division
Defense Technical Information Center
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Dear Sirs:

Enclosed please find two (2) copies of a document for inclusion in DROLS and partial distribution by DTIC:

Directory of Manufacturing Research Centers. MTIAC HB-89-01. This document is available from MTIAC in hard copy or floppy disk for $75.00. DTIC is to distribute microfiche only. It should not be sent to NTIS.

Field 22 should read:
Availability: MTIAC, IIT Research Institute, 10 West 35th Street, Chicago, IL 60616. HC or Floppy disk $75.00. Microfiche copies only from DTIC. (No copies furnished by NTIS).

Please give me a call if you have any questions about this directory.

Thank you for your assistance.

Sincerely,

Michal Safar
Operations Coordinator - MTIAC

MS/mh
encls.

cc: L. Lehn
P. Klinefelter

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This document represents the first attempt to provide a directory of existing manufacturing technology centers. To be included in the directory, the centers must (1) be involved in manufacturing research and (2) be available to the manufacturing community on a free or fee basis. Corporate or government manufacturing research activities with limited availability were not included nor were activities such as professional societies and trade associations which do not normally conduct research. These criteria were applied based on information provided and subsequently approved by the centers themselves.

More than 160 centers are listed in this directory. Several organizations, which nominally meet the established criteria, elected not to be included since they presently were not prepared to handle inquiries. Several centers in the process of being organized, also opted not to be included. The directory has been prepared so that
(continued)

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19. Abstract (continued)

additions can be made with relative ease. Anyone knowing of other centers that should be included may provide MTIAC with as much information as possible on those centers. All centers so identified will be contacted prior to issuance of the second edition.

DIRECTORY OF MANUFACTURING RESEARCH CENTERS

JUNE 1989

Complied by: H. Wakeley
C. Sessions-Robinson
M. Hernandez
C. Spoor
M. Stevens-Safar

Manufacturing Technology Information Analysis Center
10 West 35th Street
Chicago, Illinois 60616
312/567-4730

MTIAC
A DoD Information Analysis Center

FOREWORD

This directory has been prepared by the Manufacturing Technology Information Analysis Center (MTIAC) as a service to DoD, the DoD contractors, other industry, local government and the centers themselves. There has been a proliferation of manufacturing research centers organized to serve various constituencies based on technology, geography, or industry. Many of these centers are relatively new and their existence is known only to a small portion of potential users. Each center represents an organization available to provide unique products and services.

This document represents the first attempt to provide a directory of existing manufacturing technology centers. To be included in the directory, the centers must (1) be involved in manufacturing research and (2) be available to the manufacturing community on a free or fee basis. Corporate or government manufacturing research activities with limited availability were not included nor were activities such as professional societies and trade associations which do not normally conduct research. These criteria were applied based on information provided and subsequently approved by the centers themselves.

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The centers are listed in order of assigned center number. Indexes by center name, affiliation, personal name, state and keywords are included. Information on each includes addresses, telephone numbers, the host organization, technical areas, and funding information.

MTIAC staff contributing to this effort include Dr. Harold Wakeley, Cynthia Spoor, Carol Sessions-Robinson, Michal Stevens-Safar, and Marge Hernandez. DoD direction for this effort was provided by the Contract Officers Technical Representative, Dr. Lloyd Lehn. Appreciation is expressed to the Navy ManTech Office, and in particular to Stephen Linder, for providing the funding to make this directory possible.

IN ADDITION TO THIS PRINTED VERSION OF THE DIRECTORY, THE INFORMATION IS AVAILABLE AS AN ASCII FILE ON A FLOPPY DISK. THE DIRECTORY IS ALSO AVAILABLE ON-LINE TO REGISTERED USERS OF MTIAC. FOR MORE INFORMATION SEE THE ORDER FORM AT THE END OF THIS DIRECTORY.

TABLE OF CONTENTS

USING THIS DIRECTORY

This directory was generated from a data base of information on manufacturing research centers. The data base software used is INGRES. It is MTIAC's intent to keep the data base revised on a continuing basis and to print full directory revisions at regular intervals.

Center Identification Number

Each center has been assigned a unique identification number. This is the number that appears in the upper right hand corner of each entry and is the number referenced in the indexes. The centers appear in this directory in Center Identification Number order.

Glossary

This is a list of abbreviations and acronyms used throughout the Directory, particularly in the keyword index.

Center Name Index

This is an alphabetical listing of all the centers and their corresponding identification numbers.

State Index

This index references all of the centers by state and identification number.

Affiliation Index

This index includes references to all organizations named in the directory. These include the host organizations, sponsors and affiliates.

Personal Name Index

All of the personal names in the index are referenced back to the center where they appear. The names include center directors, staff members and other involved personnel.

Keyword Index

The technical areas covered by each center are indexed here. Refer to the glossary for explanation of abbreviations and acronyms.

GLOSSARY

APT	Automatically Programmed Tool
CAD	Computer Aided Design
CADD	Computer Aided Design and Drafting
CAE	Computer Aided Engineering
CAI	Computer Aided Inspection
CAM	Computer Aided Manufacturing
CIM	Computer Integrated Manufacturing
CNC	Computer Numerical Control
DNC	Distributed Numerical Control
EDM	Electrical Discharge Machining
FMS	Flexible Manufacturing Systems
JIT	Just In Time
LAN	Local Area Network
MAP	Manufacturing Automation Protocol
MIS	Management Information Systems
MRP	Manufacturing Resource Planning
NC	Numerical Control
SPC	Statistical Process Control
VLSI	Very Large Scale Integration

Center Name Index

State Index

Personal Name Index

Personal Name Index

Center Number: 1

Advanced Manufacturing Technology Center (AMTC)
307 Dunstan Hall
Auburn University, AL 36849
205 826-4340

Organized: 1984

Host Organization
- Auburn University

J.T. Black, Director

Dr. Jim Hool, Quality and Reliability Lab
Dr. Bernard Jiang, Precision Measurement Lab
Dr. Don Joo, Manufacturing Systems Modeling Lab
Dr. Kofi Nyamekye, Cellular Manufacturing Systems Lab

Technical areas include cellular manufacturing systems; full-scale robotic cells; manufacturing systems modeling, robot process capability, mobile robots, and Taguchi methods.

The goal of the center, organized in 1984, is to develop advanced manufacturing expertise for small or medium sized manufacturing businesses in the southeast region. The organization consists of 12 faculty members (industrial, mechanical, computer/science, agricultural engineering), approximately 24 graduate students, and six full-time staff members.

Funding for the center has totaled approximately $3 million including capitalization, with support by John Deere and other sponsored research.

Publications include general brochures and an annual progress report.

Facilities: Includes 10,000 sq ft of laboratory space

Facilities Total: 28,000 sq ft

Advanced Manufacturing Technology Center (AMTC)
Itawamba Community College
653 Eason Boulevard
Tupelo, MS 38801
601 842-5621

Organized: 1983

Host Organization
- Itawamba Community College
Sponsor(s)
- State of Mississippi

Charles Chrestman, Director

David Neilson, Staff
Harry Presley, Staff

Technical areas include robotics, CNC, CADD/CAM, and laser/electro-optics.

The AMTC at ICC began formation in 1983. The primary purposes of the center are instruction for full-time students (during the day) and part-time students (in the evening). It provides a variety of intermediate and advanced support activities for small and medium-sized manufacturers. Components of the center were organized in 1984. The center is pursuing the goal to provide advanced automation support for small area industries. The organization consists of 9 faculty members.

Support is provided by the State of Mississippi, local counties and external agencies.

Brochures are being prepared for publication.

Facilities: Facilities are in preparation.

Advanced Manufacturing Technology Center (AMTEC)
Augusta Technical Institute
3116 Deans Bridge Road
Augusta, GA 30906
404 796-6900

Organized: 1983

Host Organization
- Augusta Technical Institute
Sponsor(s)
- State of Georgia

Jim Weaver, Director

Carl Reichel, Staff

Technical areas include manufacturing technology, mechanical engineering, electric/electronic engineering systems, material science, computer engineering and design, robotics, desk top manufacturing, work cells, and design to production development.

The center was organized in 1983. Its goal is to provide trained manufacturing technologists, serve as an economic development tool for the area, demonstrate the application of advanced technology to industry needs, and support work force retraining programs. The organization consists of one full-time staff member and five faculty members.

Funding comes from the State of Georgia and a consortium of industries.

Publications include a general brochure in preparation.

Facilities: Expansion to 24,000 sq ft underway

Facilities Total: 12,000 sq ft

Advanced Technology Center (ATC)
Industrial Careers Building
Triton College
2000 Fifth Avenue
River Grove, IL 60171
312 456-0300

Organized: 1988

Host Organization
- Triton College
Sponsor(s)
- State of Illinois

Dr. Tom Bondi, Acting Co-Director
Dr. Lia Brillhalt, Acting Co-Director

Technical areas include CIM, flexible manufacturing, CAD, CAM, robotics, fluid power, QA/QC, CNC, conventional machining, automatic welding.

The center is to be established in late 1988 and will be staffed by one full-time engineer and 20 faculty members. The goal is to serve the local community by applying knowledge and training in advanced technology to manufacturers' problems.

Sustaining funds come from the State of Illinois with foundation endowments providing capitalization and special projects support.

Center Number: 5

Advanced Technology Center for Northeastern Pennsylvania (ATC/NEP)
Luzerne County Community College
Prospect Street and Middle Road
Nanticoke, PA 18634
717 829-7381

Organized: 1988

Host Organization
- Luzerne County Community College
Sponsor(s)
- State of Pennsylvania

Wesley E. Franklin, Executive Director

Sohail Anwar, Laser/Electro-Optics
John Corgan, CAD, Computer Systems
Daniel Cronauer, Automated Systems/Robotics
John Meade, CNC, CIM

Technical areas include automated systems/robotics technology, computer systems maintenance technology, computer integrated manufacturing technology, computerized NC technology, laser/electro-optics technology, mechanical drafting, design and electrical/electronics technology.

The center, organized August 29, 1988 has 15 full-time employees, 15 part-time employees, and one technician. Committed to the introduction of new technolgoy to the workplace, the goal of the Advanced Technology Center is to produce technically competent persons capable of assisting regional industry in a variety of support functions, provide area companies with technology exchanges and perform cooperative training projects.

One-third of their funding comes from the county, one-third from the state, and one-third from tuition.

Publications include a brochure and flyers describing specific course offerings.

Facilities: Technology center includes robotics, laser, CNC, CIM, manufacturing processes, fluid power, electronics and CAD laboratories.

Facilities Total: 82,000 sq ft

Alabama Center for Quality and Productivity
P.O. Box 2216
Decatur, AL 35690-2216
205 353-3102 Fax: x281

Organized: 1986

Host Organization
- Calhoun State Community College
Sponsor(s)
- State of Alabama

Ray Campbell, Director

Dr. Vic Gray, Assistant Director

Ms. Elise Johnston, Office Manager

Technical areas include education and training, robotics, CNC, CIM, flexible manufacturing, manufacturing processes, and team building.

The goal of the center, organized in 1986 (1989 ground breaking), is to provide industry with requested training and education in applied high technology (modern equipment) and applied high techniques (advanced strategies and methods) and to promote industry-education cooperation. The organization consists of 11 full-time employees, and 7 part-time employees. Students trained from October 1987 through September 1988 totaled 1,514. This training was for 16 different clients.

Funding for the center has come from Saginaw Division of General Motors in the form of land donation and operational funds from State of Alabama appropriations and client fees.

Publications include a prospectus and a brochure.

Facilities: New facilities include office space, computer center, classrooms, and high technology demonstration lab.

Facilities Total: 60,000 sq ft

Center Number: 7

Alliance for Manufacturing Productivity
2320 Marinship Way
Sausalito, CA 94965
415 332-23[illegible]

Organized: 1987

Host Organization
- Autodesk, Inc.

Joe Oakey, Director

Technical areas include identifying, developing, and disseminating technical information, training, and services; cooperation with other national, regional and local agencies; facilitate exchange of information among members and independent manufacturing technology agencies and schools.

The goal of the center, organized in 1987, is demonstrating that two-year post-secondary technical institutions are the best vehicle for the transfer of technology to small businesses. Also to pursue the opportunity to become a Hollings Center and assist small industries with transfer of technology and methods.

Publications include general brochures and educational programs.

Center Number: 8

American Manufacturing Research Consortium
Center for Manufacturing Excellence
Trident Research Center
5300 International Boulevard
North Charleston, SC 29418
803 760-3200

Organized: 1986

Host Organization
- South Carolina Research Authority

Mr. Gary Gajewski, Director

Technical areas include CIM, flexible manufacturing systems, manufacturing systems design and integration, computer/communications networking, digitization of aperture cards and technical data, digital data (e.g., IGES, PDES), driven manufacturing functions and processes, and flexible, modular manufacturing systems architectures suitable for phased implementations and a variety of processes. Applications to date include small mechanical parts, printed wiring assemblies, engine blade/vane repair and international manufacturing standards.

The center was organized in 1986 to facilitate the implementation of leading-edge manufacturing technologies. The organization consists of more than 100 full-time staff memebers.

Ongoing efforts for DoD and PDES, Inc amount to $20 million annually.

Descriptive brochures are available.

Facilities: Facilities include two engineering modules.

Facilities Total: 40,000 sq ft

Apparel Manufacturing Technology Center (AMTC)
Apparel Institute, Apparel and Textile Department
Southern Tech
1112 Clay Street
Marietta, GA 30060
404 424-7273

Organized: 1988

Host Organization
- Georgia Institute of Technology
- Southern Tech

Sponsor(s)
- Defense Logistics Agency

Larry Haddock, Director

John Adams, Staff

Technical areas include flexible manufacturing systems, machine vision and robotics, product quality control, MRP and MRP II, plant modeling and capital investment. Research includes: analysis of apparel manufacturing using technology in pattern packing, marker making, fabric cutting, material handling and real time data management.

The center was organized in 1988. Its goal is to increase the vitality of the American apparel industry by: (1) testing and evaluating commercially available, high technology manufacturing processes and systems; (2) providing students with practical hands-on manufacturing experience; (3) establishing an ongoing research program to advance the state of existing technology; (4) addressing specific needs of member companies. The organization consists of 5 full-time staff members, 4 faculty members, 2 graduate students and access to a pool of 20 faculty.

Funding is from the Defense Logistics Agency at a level of $7 million for 5 years.

Publications include general brochures, a quarterly newsletter, bulletins, and reports.

Facilities: Facilities include a pilot plant at Southern Tech Center of Excellence in Apparel and Textile Manufacturing and access to other labs.

Facilities Total: 5,000 sq ft

Applied Science and Technology Center
Bakersfield College
1801 Panorama Drive
Bakersfield, CA 93305
805 395-4094

Organized: 1980

Host Organization
- Bakersfield College
Sponsor(s)
- State of California

Larry Fanucchi, Division Chairman

Dennis Jorgensen, Professor
Bob Tuttle, Professor

Technical areas include computer aided manufacturing, CNC machine tooling, CAD, and specialized assistance to small businesses, principally in customized training.

The goal of the center, organized in 1980-1981, is education and production of trained operators and programmers for community industry and to provide automation assistance to local area businesses, principally oil drilling. The organization includes two full-time staff members and two part-time members.

Funding is provided by the State of California.

Publications include college catalog, contract education brochures and flyers.

Facilities: Facilities include a 1,800 sq ft CAD laboratory and a 7,000 sq ft machine tool laboratory.

Facilities Total: 8,800 sq ft

Applied Technology Center
Milwaukee School of Engineering
P.O. Box 641
Milwaukee, WI 53201
414 277-7398

Organized: 1981

Host Organization
- Milwaukee School of Engineering

Thomas W. Davis, Director

Vince Canino, Director, Biomedical Research Institute
Harry Schopler, Director, Applied Industrial Research Institute
Tom Warnke, Director, Fluid Power Institute

Technical areas include CIM, automation networking, materials science, fluid power, quality, Taguchi, and human factors laboratory.

The center was organized in 1981. Its goal is to apply skills and knowledge to industrial settings with specialized research for clients. The organization consists of 50 faculty members and 100 graduate and undergraduate students.

Funding is provided by private and government contracts, and membership in a consortium 3-year program on manufactuing protocols. The annual budget is $1 million.

Descriptive brochures are available.

Facilities Total: 10,000 sq ft

Arkansas Center for Technology Transfer (ACTT)
University of Arkansas
Fayetteville, AR 72701
501 575-3747

Organized: 1985

Host Organization
- University of Arkansas - Fayetteville
Sponsor(s)
- State of Arkansas

Willaim Rader, Director

Stephen Adams, Field Engineer
Susan Eschbach, Director, Center for Interactive Technology
Robert Falcinelli, Project Engineer
Alline Fulton, Director of Programming, Interactive Technology
Karen Hendrix, Secretary, ACTT
Dr. John Imhoff, Director, Productivity Center
Marcus Langston, Director, Center for Robotics and Automation
George Laux, Field Engineer
Ali Manesh, CAD/CAM Coordinator, Center for Robotics
Sarah Santos, Secretary, Center for Robotics

Technical areas include center for robotics and automation, field engineering service (two engineers identifying problems and solutions), productivity center, quality, line design, human resources, and interactive technology (computer and video training).

The goal of the center, organized in 1985, is to provide technical assistance to industry in the state of Arkansas.

Funding for ACTT is approximately $1.25 million, which is 25 percent from the State of Arkansas, and 75 percent from external grants and contracts.

Publications include an annual report, brochures, and research reports.

Facilities: Facilities include three laboratories for robotics, material handling and manufacturing automation.

Automated Manufacturing Center
Williamsport Community College
Division of Technology and Engineering
1005 West Third Street
Williamsport, PA 17701
717 326-3761

Organized: 1988

Host Organization
- Williamsport Community College
Sponsor(s)
- State of Pennsylvania

Dr. George Baker, Director

Dr. Jim Rice, Dean, Institutions Advancement

Technical areas include metrology, tool making, robotics, material handling, quality assurance and nondestructive testing, plastics and polymers, lasers, fiber optics, computer maintenance, and civil engineering technology.

The center was organized in 1988. Its goal is to provide automated manufacturing technology training and applications research programs for industry, serving as a clearinghouse for problems. The organization consists of 10 full-time staff members and 40 faculty members.

Funding in the amount of $20 million was provided by the state, federal and local government and industry. One million dollars will be provided annually through the state industrial resource center program.

Descriptive brochures are available.

Facilities Total: 156,000 sq ft

Automation and Robotics Applications Center (ARAC)
University of Southern Mississippi
Southern Station
Box 10047
Hattiesburg, MS 39406-1004
601 266-5591

Organized: 1986

Host Organization
- University of Mississippi

Sponsor(s)
- National Aeronautics and Space Administration; State of Mississippi

Dr. Howard Heiden, Director
Dr. David Huffman, Director

Cecil Harrison, Staff
Joe Jordan, Staff
Dr. John Lipscomb, Staff
William E. Mueller, Staff
Dr. S. Kant Vajpaye, Staff

Technical areas include robotics, manufacturing automation, manufacturing methods, process engineering, vibration and noise control, simulation, data base searches, technical audits and CNC.

The center was organized in 1986. The goal is the dissemination of NASA technology to the private sector and providing advanced automation assistance to industry in the area. The organization consists of 24 faculty members, two clerical and data processors, and one consultant.

Funding is provided by the State of Mississippi support, NASA contract and industry.

Brochures are available.

Facilities Total: 10,000 sq ft

Automation and Robotics Research Institute (ARRI)
7300 Jack Newell Boulevard South
Fort Worth, TX 76118
817 284-6101

Organized: 1985

Host Organization
- University of Texas at Arlington
Sponsor(s)
- Fort Worth Chamber of Commerce; State of Texas

Jeffrey H. Collins, Director

T. M. Sparr, Associate Driector

J. M. Fitzgerald, Manager, Integrated Manufacturing Lab
Karan Harbison-Briggs, Mgr., AI for Manufacturing Lab

Technical areas - 1. Automation and robotics technology: CAD to CAM; abrasive waterjet; tool failure monitoring; robotic welding; dynamic accuracy assessment for robots; transputer technology; manufacturing in space. 2. Factory systems: CIM test beds; SPC; product engineering; artificial intelligence applications; factory system architectures. 3. Technology transfer: transfer of computer aided manufacturing knowledge to small companies; technical consultancy; seminars, demonstration facilities and training courses.

The center was organized in 1985. Its goal is to work with industry as the applied research arm of the University of Texas at Arlington to solve real manufacturing problems. The organization consists of 12 faculty members with a pool of 50 to draw from, 20 graduate students, and 10 full-time professionals.

Startup funding in the amount of $10 million was provided by the Fort Worth Chamber of Commerce and companies in the Fort Worth area. Sustaining funding is provided by the State of Texas in the amount of $1 million annually. Additional funding is provided by contracts and grants.

Publications include brochures and a list of publications.

Facilities: Laboratory space with some areas dedicated to specific projects.

Facilities Total: 50,000 sq ft

Automation Center
P.O. Box 10367
Trident Technical College
7000 Rivers Avenue
North Charleston, SC 29411
803 572-6178

Organized: 1986

Host Organization
- Trident Technical College
Sponsor(s)
- State of South Carolina

Jim Rehg, Director

Technical areas include CAD/CAM, bar code, program logics, shop floor control, robotics, MRP II and production planning and control.

The center was organized in 1986. Its goal is to provide an increase in productivity of small to medium sized manfacturers. The organization consists of a pool of 14 faculty members, one full-time staff member and 30 students.

Funding is provided by industry and the State of South Carolina.

Descriptive brochures are available.

Facilities Total: 4,000 sq ft

Basic Industry Research Laboratories (BIRL)
1801 Maple Avenue
Northwestern University
Evanston, IL 60102
312 491-4941

Organized: 1987

Host Organization
- Northwestern University

Dr. Raymond Fessler, Director

Dr. J. Wesley Cox, Associate Director
Dr. Doyle P. Skinner, Assistant Director

Technical areas include : Materials - composite polymers, ceramics, coatings; manufacturing technolo - applying advanced technology to traditional processes and development of new processes or products.

The laboratory, organized in 1987 was constructed with DOE funds and is owned and operated by the University. It has a staff of 165 full-time employees and 75 faculty members. The goal is to improve the economic health of U.S. industry by accelerating the successful transfer of results from research to the industrial marketplace. They conduct R&D on a contract basis.

The funding is sustaining - $2 million/year; contracts and grants - $16 million/year; additional multiclient programs.

Publications consist of brochures, quarterly newsletters, and two mission and objectives statements.

Facilities: Facilities include laboratories and research space.

Facilities Total: 130,000 sq ft

Center Number: 18

Bell Center for Technology
P.O. Box PSU
Lehman, PA 18627
717 675-2171

Organized: 1989

Host Organization
- Penn State - Wilkes Barre

Dr. James H. Ryan, CEO

Technical areas include engineering technology, ME technology, CAD, EE technology, digital microprocessors, surveying, drafting, telecommunications, manufacturing technology, CAM and robotics.

The center is planned for 1989 and a $2.5 million building. The goal is to provide training in manufacturing technology and access to laboratories for local industry and business.

Publications consist of a brochure.

Facilities: Facilities in the planning and construction stages.

Ben Franklin Technology Center of Southeastern Pennsylvania (BFTC/SEP)
University City Science Center
3624 Market Street
Philadelphia, PA 19104
215 387-2255

Organized: 1983

Sponsor(s)
- State of Pennsylvania

Dr. Phillip A. Singerman, Executive Director

Technical areas include medical and biological technology, computer technology and information processing, manufacturing processes and sensor technology, materials development, engineering and processing.

The center, organized in 1983, has 15 full-time employees. The goal is economic development through the creation and applilcation of the technologies.

Their annual State of Pennsylvania allocation is over $7 million with $29 million matching funds from industry and other sources.

Publications include a brochure.

Facilities: Use of laboratories of participating organizations.

Bergen County Tech Institute
280 Hackensack Avenue
Hackensack, NJ 07601
201 343-5509

Organized: 1988

Sponsor(s)
- Bergin County; State of New Jersey

Dr. Bonnie Marmor, Director

Mr. Albert Gasior, Assistant Director

Mr. George Gonzalez, Instruments
Mr. Henry VanKooy, Coordinator, Technology Program

Technical areas include CAD/CAM, tool path simulation, robotics, and CIM.

The center, organized in 1988, consists of three full-time employees, and six faculty members. The goal is to provide trained manufacturing technologists for local industry and to provide facilities and technology transfer for county based industries to develop and adapt advanced automation technology.

Funding comes from the State of New Jersey and Bergin County.

A brochure is in preparation.

Facilities: building

Facilities Total: 2,600 sq ft.

Bevill Center for Advanced Manufacturing Technology
P.O. Box 2488
Gadsden, AL 35903
205 547-5782

Organized: 1987

Host Organization
- City of Gadsden
- Gadsden State Community College
- University of Alabama

Sponsor(s)
- Tennessee Valley Authority

Mr. Frank Bankson, Director

Mr. Greg Bennett, Research Director
Mr. Mark Dye, Training Director

Technical areas include CAD/CAM, Robotics, CNC machining, computer aided inspection.

The goal of the center, organized in August 1987, is twofold, with technology transfer to teach transfer through education and training, and applied research with direct assistance to companies. The organization has access to a pool of 200 faculty and associated graduate students, and eight to nine on-site research professionals.

Initial capitalization of approximately $1.3 million is supplementary TVA subsistence funding, and an additional $1 million in federal contracts and subcontracts research in process.

Publications include general brochures.

CAD/CAM Center
Owens Technical College
351 First Street
AM Point Industrial Park
Perrysburg, OH 43551
419 666-0580

Organized: 1986

Host Organization
- Owens Technology College
Sponsor(s)
- State of Ohio

Dr. David Winters, Director

Technical areas include CAD/CAM, industrial robotics, program logic, material handling, automated mechanical engineering, LAN's, CIM, and metrology.

The center was organized in 1986. Its goal is to direct intensive courses and provide consulting services for small business and industry. The organization consists of six full-time staff members, 50 faculty members and 10 students.

Funding is provided by the State of Ohio (Edison grant) in the amount of $600 thousand yearly and through industry and state colleges.

Brochures are available.

Facilities: CAD/CAM is dedicated 5,000 sq. ft.

Facilities Total: 20,000 sq. ft.

CAM Software Research Center
SAL Systems Automation Center
265 Crabtree Technology Building
Brigham Young University
Provo, UT 84602
801 378-3895

Organized: 1978

Host Organization
- Brigham Young University
Sponsor(s)
- State of Utah

Mr. Dell K. Allen, Director

Mr. Anthony Berrett, Research Associate
Mr. Jeffrey J. Leavy, Research Associate

Technical areas include group technology, factory automation, manufacturing simulation, robotics, NC, design for assembly, manufacturability, composites, polymers, plastics, and tooling and fixturing.

The center was organized in 1978. Its goal is to provide total integration of manufacturing systems for industry. The organization consists of three full-time staff members, 10 faculty members from six departments and five colleges, and 10 to 15 graduate students.

Funding for the center is provided by the State of Utah and indigenous industry.

Publications include research reports and brochures.

Facilities Total: 3,000 sq. ft.

Center Number: 24

Catonsville Community College
800 South Rolling Road
Baltimore, MD 21228
301 455-4491

Organized: 1983

Host Organization
- Catonsville Community College

Mr. Mike Carey
Mr. Mike Ehrlinger
Mr. John Walstrum

Technical areas include specialized instruction programs in manufacturing technology, on-site training, and applied research problems.

The center, organized in 1983, is pursuing the goal to provide trained manufacturing technologists, special programs, and research support for businesses in the State of Maryland. The organization consists of five faculty members and 10 adjunct professors.

Funding comes through the private sector and tuitions.

Publications include a CAD/CAM brochure.

Facilities: Expansion program now underway.

Facilities Total: 18,000 sq. ft.

Center for Advanced Manufacturing
University of Dayton
300 College Park
Dayton, OH 45469
513 229-2969

Organized: 1989

Host Organization
- University of Dayton

Robert L. Mott, Director

The Center for Advanced Manufacturing promotes, facilitates and coordinates educational offerings and uniquely interdisciplinary services to students, industry and Government that will improve the manufacturing capabilities and competitiveness of the United States of America. Industry and Government input is aggressively solicited to ensure that the University presents an array of relevant services and that its graduates are well prepared to be leaders.

The Center works in cooperation with existing academic units, the University of Dayton Research Institute, other centers and the University administration. Emphasis is placed on activities that build on existing strengths bringing teams together that can perform manufacturing related research, offer services to industry and Government, develop academic courses or programs, and develop University facilities. The Center directs its efforts toward the development, improvement and application of advanced manufacturing technologies.

Important linkages among business administration, engineering, engineering technology, education, law, the social and natural sciences, and the humanities are actively promoted to offer more highly integrated courses, programs, and services that relate to design and manufacturing. The Center promotes inquiry into the moral and ethical issues related to the management of manufacturing enterprises and the appropriate use of technology.

To continue to be responsive to the needs of students, faculty, industry and Government, the Center endeavors to enhance the awareness of the University community of the rapidly changing manufacturing technology environment.

Center for Advanced Technology
Chattanooga State Technical Community College
4501 Amnicola Highway
Chattanooga, TN 37406
615 697-4411

Organized: 1984

Host Organization
- Chattanooga State Technical Community College

Mr. Steve Reed, Director

Adrian Baird, Staff
Jim Barrott, Staff
Oliver Benton, Staff
Harry Wagner, Staff

Technical areas include manufacturing technologies, CAD, CAM, robotics programmable controller, CNC machine tools, computer integrated manufacturing, inventory planning and purchasing, supervising quality, flexible manufacturing, automated office center.

The center was organized in 1984. Its goal is threefold - training and retraining in the new technologies for industry, attracting new industries by improving local climate, and providing quality training for graduates. The organization consists of 20 faculty members, 200 students and four full-time staff members.

Funding includes state, industrial and foundation grants.

Descriptive brochures and videotapes are available.

Facilities Total: 15,000 sq. ft.

Center for Applied Optic Studies
Rose-Hulman Institute
5500 Wabash Avenue
Terre Haute, IN 47803
812 877-1511

Organized: 1985

Host Organization
- Rose-Hulman Institute
Sponsor(s)
- Indiana Corporation for Science and Technology

Dr. Brij Khorana, Director

Dr. Robert M. Bunch, Associate Professor

Technical areas include fiber optics, holographic interferometry, nonlinear optics, photo reflective materials, thin films, electronic speech pattern analysis, interferometry, metrology, optical metrology, and optical design facilities for lenses.

The center was organized in 1985 with the goal to provide education and research on applied optics projects of specific interest to industry. Staff includes seven full-time faculty members and 14 graduate students.

The funding is derived from industrial projects, government organizations, and the Indiana Corporation for Science and Technology. It was capitalized with $1 million of "seed" money to be used for matching grants.

Brochures in preparation.

Facilities: laboratories

Facilities Total: 1,000 sq. ft.

Center for Automation and Manufacturing Science (CAMS)
School of Engineering
Stanford University
Stanford, CA 94305-4028
415 723-9038

Organized: 1984

Host Organization
- Stanford Institute for Manufacturing and Automation (SIMA)
- Stanford University

Sponsor(s)
- 3M; Alcoa; Apple Computer; Bechtel Corporation; Boeing Company; DEC; Douglas; FMC; Ford; General Electric; General Motors; Hewlett-Packard; Honeywell; IBM; Lockheed; UNISYS

Prof. Robert H. Cannon, Director
A. P. Jean-Claude Latombe, Director

Technical areas include aeronautics and astronautics aerospace robotics laboratory, computer science robotics laboratory. The Aerospace Robotic Laboratory research focuses mainly on the precise control of one or more manipulators in carrying out tasks cooperatively. The interests of the Computer Science Robotics Laboratory include intelligent programmable automation, vision, navigation, sensory-based control, robot planning and, in cooperation with other departments, the systems integration of these technologies.

The center was organized in 1984. Its goal is to support the SIMA goals of defining manufacturing as an engineering science by focusing research and education efforts on issues in the design process; the forming and processing of innovative materials, automation, robotics, and manufacturing systems management. The organization consists of five faculty members, five staff members, 19 graduate students and one full-time engineer.

Total SIMA funding includes approximately $1.2 million annually in corporate sponsorship, grants and contracts.

Publications include a yearly status report, a regular newsletter, and a list of SIMA publications.

Facilities: The aerospace Robotics Laboratory, and the Computer Science Department Robotics Laboratory

Facilities Total: 2,300 sq. ft.

Center for Automation Research (CFAR)
University of Maryland
College Park, MD 20742-3411
301 454-4526

Organized: 1983

Host Organization
- University of Maryland
Sponsor(s)
- State of Maryland

Dr. Azriel Rosenfeld, Director

Mr. Larry Davis, Staff
Mr. Ben Shneiderman, Staff
Mr. Jackson Yang, Staff

Technical areas include robotics - construction application, vision navigation, robot environment analysis - kinematics, vision - theory, autonomous vehicles, autonomous underwater vehicles, parallel processing, software, and data structures.

The center, organized in 1983, is pursuing the goal to foster the advancement of automation and technology. The organization consists of 10 staff members, 10 faculty members, 50 graduate students and 10 visiting faculty members.

Their funding comes through contracts with 10 to 15 percent from the State of Maryland. The overall budget is $2 to $3 million yearly.

Publications include brochures and annual reports.

Facilities: Vision Laboratory, robotics laboratory, and man-machine (human/computer) laboratory.

Facilities Total: 12,000 sq. ft.

Center for Automation Technology (CAT)
Drexel University
32nd and Chestnut
Philadelphia, PA 19104
215 895-2900

Organized: 1989

Host Organization
- Drexel University

Dr. Ken Geller, Assistant Vice President of Research
Dr. Richard Schneider, Vice President of Research
Mr. Richard Woodring, Dean

Technical areas include materials, processing, plasma spray technology, intelligent controls, and near net shape manufacturing.

The center, to be organized in 1989, plans a staff of 25 faculty members and 20 graduate students. The goal is to integrate manufacturing-related technologies within a university, and to impart intelligent manufacturing processing and quality technologies.

They have direct funding: capitalization $6.5 million plus $5.5 million and R&D funding of $4 million.

Publications include a prospectus.

Facilities: They have a new building.

Center for Computer Aided Design
College of Engineering
University of Iowa
Iowa City, IA 52242
319 335-5939

Organized: 1980

Host Organization
- University of Iowa

Sponsor(s)
- National Aeronautics and Space Administration; National Science Foundation; U.S. Army

Prof. Ed Haug, Director

Dr. Dennis Golden, Associate Director

Technical areas include mechanical system dynamics, parallel processing applications, simulation methods, design of machines, and design optimization.

The center was established in 1980 and reorganized in 1987. Its goal is the creation of advanced computer-aided engineering software tools. The organization includes 11 professionals, four clerical staff, 10 faculty, and 48 students.

Funding comes from grants and contracts from NSF, U.S. Army, NASA, and industrial sponsors.

Publications include a booklet for prospective participants.

Facilities: Laboratory space with Alliant, Encore and VAX computers, a graphics laboratory, and 30 workstations.

Facilities Total: 8,000 sq. ft.

Center for Computer-Aided Engineering
AF Small Building
University of Virginia
Charlottesville, VA 22901
804 924-3759

Organized: 1983

Host Organization
- University of Virginia - Charlottesville

Dr. Ira Jacobson, Director

Dr. Larry Richards, Staff

Technical areas include material science, robotics, automatic controls, CAD and analysis, machine vision, CAM, networking, distributed computing, program controls, and expert systems for design and manufacturing.

The center was organized in 1983. Its goal is to provide research for industry to improve the level of local technology and provide on-site specialized instructions. The organization consists of a pool of 25 faculty members and a pool of 70 students.

Annual funding is provided by industry and the military in the amount of $200 to $300 thousand.

Descriptive brochures are available.

Facilities: New building to come. 12,000 sq ft minimum with 36,000 sq.ft. planned

Facilities Total: 36,000 sq. ft.

Center Number: 33

Center for Computer Integrated Engineering and Manufacturing (CCIEM)
101 Perkins Hall
University of Tennessee
Knoxville, TN 37996-2000
615 974-3333

Organized: 1985

Host Organization
- University of Tennessee
Sponsor(s)
- Martin Marietta; State of Tennessee

Dr. Bill Sullivan, Director

Dr. Asa Bishop, Staff
Dr. Ken Kirby, Staff
Dr. Osama Soliman, Staff
Dr. Clem Wilson, Staff

Technical areas include solids and fluid modeling, finite element analysis applied to computational mechanics; computer communications protocols; artificial intelligence in design; and vision systems and robotics. Other areas of expertise are management information systems, information gathering (e.g. bibiliographies and abstracts), and strategic planning for integrated manufacturing systems and production processes.

The center was organized in 1985. Its goal is to offer technical assistance to small and medium-sized Tennessee manufacturers. The organization consists of 25 faculty members and 15 graduate students (10 PhD's).

Funding is provided by sustaining industrial memberships, ($10,000; $25,000; $50,000 yearly memberships), the State of Tennessee, and Martin Marietta.

Publications include prospectus, brochures, newsletter and semiannual reports for sponsors.

Facilities: New building under construction with three lab areas of 2,000 sq ft, 2,500 sq ft, and 4,000 sq ft

Facilities Total: 8,500 sq. ft.

Center for Cooperative Autonomous Robots for Hazardous Environments
Department of Electric and Computer Engineering
Rice University
Houston, TX 77251-1892
713 527-4020

Organized: 1985

Host Organization
- Rice University

Prof. Rui J.P. Defigueiredo, Director

Prof. John Cheatham, Staff
Prof. Robert Jump, Staff
Prof. J.B. Pearson, Staff

Technical areas include space robotics and automation, cooperative intelligent mobile robotic laboratory (CIMRL), robot vision, power processing, robotic systems, and human-machine interface.

The center was organized in 1985. Its goal is the development of intelligent cooperative autonomous robotic systems. The organization consists of 19 faculty members in five departments, 30 graduate students, and three full-time staff members.

Annual funding of $1 million is provided by sustaining sponsors and grants.

Descriptive brochures are available.

Facilities: laboratories

Facilities Total: 3,500 sq. ft.

Center for Design Research (CDR)
School of Engineering
Stanford University
Stanford, CA 94305-4028
415 723-9038

Organized: 1984

Host Organization
- Stanford Institute for Manufacturing and Automation (SIMA)
- Stanford University

Sponsor(s)
- 3M; Alcoa; Apple Computer; Bechtel Corporation; Boeing Company; DEC; Douglas; FMC; Ford; General Electric; General Motors; Hewlett-Packard; Honeywell; IBM; Lockheed; UNISYS

Prof. Larry Leifer, Director

Prof. Elliott C. Levinthal, SIMA Director

Prof. Mark Cutkosky, Staff
Dr. Stefan Michalowski, Staff
Prof. Sheri Sheppard, Staff
Dr. Richard Steele, Staff

Technical areas include understanding design processes, the development of computer-aided concurrent engineering tools and human-machine interaction with these tools. Projects are placed in three generic groups. The first is process-specific and focuses on design methodology and designers at work. The second deals with product and process design tools. The third area is a collection of domain specific R&D tasks typically concerned with automation research.

The center was organized in 1984. Its goal is to support manufacturing as an engineering science by focusing research and education on issues in design, the forming and processing of innovative materials, automation, and manufacturing systems management. The organization includes three professors, 32 graduate students, two post-doctoral staff members, three technical staff members, and two visiting scholars.

The Center's mixture of process and content themes is part of a strategic plan to search for the underlying features of a "theory of design" through studies that take advantage of the information exchange required when "process driven" people work with "content-driven" people.

Publications include a yearly status report, a regular newsletter, and a list of SIMA publications.

Facilities: Facilities include 8,000 sq ft for laboratories and 2,600 sq ft for instruction.

Facilities Total: 10,600 sq. ft.

Center Number: 36

Center for Economy, Development and Business Research (CEO)
College of Commerce and Business Administration
Room 114, Merrill Hall
Jacksonville State University
Jacksonville, AL 36265
205 231-5324

Organized: 1984

Host Organization
- Jacksonville State University

Pat Shaddix, Director

Mr. Fred Williams, Staff

Technical areas include strategic plans, consumer opinion surveys, feasibility studies, CAD/CAM training, JIT, computer technology assistance, data base files for research expertise, market research, production management, labor analysis, transportation studies, business startup seminars, government contract procurement, supervisory training, marketing strategies, economic forecasting, and employee attitude surveys.

The goal of the center, organized in 1984, is promoting the economic growth and development of a business environment fostering the creation of jobs, investment, and expansion of Alabamas industrial base. The organization consists of a total of nine employees (six professionals and three clerical). The professional staff members are specialists in management, marketing, economics, archaeology, geography, sociology, finance, computer science, and business statistics. In addition, any of the other departments at the University may be called upon.

Publications include general brochures.

Facilities Total: 2,000 sq. ft.

Center for Engineering Design (CED)
Merrill Engineering Building
University of Utah
Salt Lake City, UT 84112
801 581-6499

Organized: 1974

Host Organization
- University of Utah

Dr. Pete Gerity, Staff
Dr. Steven Jacobsen, Staff
Dr. John Wood, Staff

Technical areas include robotics, biomedical devices, sensors, and micro-electromechanical systems.

The center was organized in 1974. Its goal, as a state Center of Excellence, is to produce technology innovation and to transfer this technology from the laboratory environment. The organization consists of five faculty members, 24 students and 35 full-time staff members.

Funding is provided by research contracts in the amount of $14 to $15 million.

Descriptive brochures are available.

Facilities Total: 50,000 sq. ft.

Center for Human Factors and Organization Effectiveness (CHFOE)
Battelle Seattle Research Center
P.O. Box C5395
4000 NE 41st Street
Seattle, WA 98105
206 525-3130

Organized: 1971

Host Organization
- Battelle Seattle Research Center
Sponsor(s)
- National Research Council; U.S. Army

Dr. Tom Triggs, Director

Dr. Alvan Bittner, Senior Staff Scientist
Dr. Barry Kantowitz, Senior Staff Scientist
Dr. Don Penner, Senior Staff Scientist

Technical areas include leadership training, performance aids, maintenance, robotics, human factors, cognition, human information processing, low fidelity simulation of maintenance facilities.

The goal of the center, organized in 1971, is to conduct research to improve the relationship between technology and people (individually and in small groups). The organization consists of 38 full-time staff members, with a resource pool of 50 faculty members and 15 graduate students.

Funding for the center is approximately $8 million per year, with the source being 25 percent NRC, 25 percent industry, 25 percent off-shore, and 25 percent DoD (Fort Lewis).

Descriptive brochures are available.

Facilities: Facilities include a 940 sq ft human performance laboratory and a 5,000 sq ft robotic laboratory.

Facilities Total: 5,940 sq. ft.

Center for Industrial Effectiveness
State University of New York at Buffalo
Baird Research Park
1576 Sweet Home Road
Amherst, NY 14221-2029
716 636-2568 Fax: 716 689-2168

Organized: 1987

Host Organization
- State University of New York at Buffalo

Dr. Colin Drury, Executive Director

Mr. Brian Kleiner, Administrative Director

Technical areas include cost analysis, strategic planning, robotics, simulation, quality control, JIT, cellular manufacturing, group technology, human factors, process planning, materials handling, training and labor relations.

The center, organized in 1987, has two full-time employees and 20 faculty members. The goal is to improve the competitiveness of companies.

The core budget is $200 thousand per year with projects amounting to $0.5 million.

Publications include descriptive materials.

Facilities: Includes classroom areas and laboratories.

Facilities Total: 30,000 sq. ft.

Center for Industrial Engineering Technology (CIET)
School of Technology
Central Connecticut State University
1615 Stanley Street
New Britain, CT 06050
203 827-7414

Organized: 1987

Host Organization
- Central Connecticut State University

Andrew Baron, Director

Kelly Smurthwaite, Administrative Assistant

Technical areas include CAM, CIM, CADD, flexible machining, tool and die programs and NC.

The center was organized in August 1987. As a State Center for Excellence it is pursuing the goal of building a partnership between university and business with quick response to industry needs for training, service, support and advanced automation interfaces within lab pilot programs. The organization will include access to a pool of 30 faculty members and 214 graduate students.

University facilities will be used with independent project funding obtained from industry.

Publications include a brochure presently in preparation.

Facilities: include laboratory and classroom space

Facilities Total: 80,000 sq. ft. access

Center for Intelligent Machines and Robotics (CIMAR)
University of Florida
300 Mechanical Engineering Building
Gainesville, FL 32611
904 392-0814

Organized: 1978

Host Organization
- University of Florida

Sponsor(s)
- General Electric; Honeywell; John Deere; McDonnell Douglas; U.S. Air Force; U.S. Department of Energy; Westinghouse

Dr. Joseph Duffy, Director

Dr. Van Chesny, Staff
Dr. Carl Crane, Staff
Dr. Roy Harral, Staff
Dr. Garry Matthew, Staff
Dr. Ralph Selfridge, Staff
Dr. John Staudhammer, Staff

Technical areas include robotics, artificial intelligence, man controlled robotics, manipulators, hybrid control, telepresence using graphics animation, motion planning of a snake robot (vertical and horizontal). Present work is concentrated upon manipulation design and control, kinematic and dynamic analysis of robotic systems, real time computer graphic simulations and the enhancement of man-machine designs by telepresence and novel controls.

The center was organized in 1978. Its goal is to develop intelligent machines for manufacturing, work cells, and the remote operation of robots. The organization includes five faculty members, 25 to 30 graduate students, and one full-time senior technician.

Funding for the center comes from Westinghouse, R&D Center, USA-Belvoir, RD&E Center, DoE, the U.S. Air Force, John Deere, McDonnell Douglas, Honeywell, and General Electric.

Publications include departmental brochures.

Facilities Total: 10,000 sq. ft.

Center for Machine Intelligence (CMI)
2001 Commonwealth Avenue
Ann Arbor, MI 48105
313 995-0900

Organized: 1985

Host Organization
- University of Michigan

Ashby Woolf, Director

Gary Van Poprin, Staff

Technical areas include electronic data systems, collaborative and cooperative technology, integration of multiple technologies, and simultaneous processing.

The center, organized in 1985, is pursuing the goal of designing very large systems and finding the solutions to very large problems with large payoffs for industry. This nonprofit organization consists of 17 staff members and some faculty members. It is not presently open to the public but it may be in the future.

Brochures are available.

Facilities Total: 7,000 sq. ft.

Center Number: 43

Center for Manufacturing Engineering
The Technological Institute
Northwestern University
Evanston, IL 60201
312 491-3747

Organized: 1983

Host Organization
- Northwestern University

Dr. Philip Jones, Director

Kornell Eman, Processes
Donald Frey, Manufacturing Strategy
William Wilson, Tribology/Sheetmetal

Technical areas include quality assurance, scheduling, manufacturing strategy, processes, robotics, and materials.

The center was organized in 1983. Their goal is to promote technology transfer from research laboratory to application. The staff includes two professionals and 26 faculty members.

Funding comes from grants and contracts.

Publications include brochures and technical reports.

Facilities: Facilities include a 1,000 sq ft robotics laboratory and materials research laboratories.

Facilities Total: 1,000 sq. ft.

Center for Manufacturing Engineering (CME)
National Institute of Standards and Technology
Building 200, Room B322
Gaithersburg, MD 20899
301 975-3401

Organized: 1978

Host Organization
- National Institute of Standards and Technology (NIST)
Affiliate Organization
- Automated Manufacturing Research Facility (AMRF)

Dr. John Simpson, Director

James Albus, Staff
Howard Bloom, Staff
Donald Bloomquist, Staff
Richard Jackson, Staff
Dennis Swyt, Staff

Technical areas include flexible automated manufacturing, robotics, precision engineering, and mechanical metallurgy.

The center, organized in 1978, is pursuing the goal to provide measurement and standard support to the discrete parts manufacturing industries, and to provide measurement standards and generic technology support for the discrete parts engineering industry. The organization consists of 300 staff members.

Funding for the center is $25 million yearly.

Publications include AMRF fact sheets, public bibliography, brochures on research association programs, and an organization chart.

Facilities: Advanced Manufacturing Research Facility (AMRF) is 5,000 sq ft, laboratory for advanced flexible manufacturing and others are 50,000 sq ft.

Facilities Total: 55,000 sq. ft.

Center Number: 45

Center for Manufacturing Engineering Systems
New Jersey Institute of Technology
323 Martin Luther King Boulevard
Newark, NJ 07102

Organized: 1987

Host Organization
- New Jersey Institute of Technology
Sponsor(s)
- State of New Jersey

Mr. Michael Pappas, Acting Executive Director

Technical areas include design, robotics, materials processing, metal removal, three-dimensional NC, microelectronics, electronics packaging, vision, and artificial intelligence.

The center organized in 1987, consists of one full-time employee, 30 faculty members (presently 13), and 60 graduate students. The goal is to provide applied research support for medium and small sized companies in New Jersey.

This $14 million technology center is funded as a State of New Jersey CIM center for education for $0.5 million per year and $800,000 per year from industry.

Publications include a prospectus and a brochure which is in preparation.

Facilities Total: 50,000 sq. ft.

Center for Manufacturing Productivity and Technology Transfer (CMPTT)
Center for Industrial Innovation
Rensselaer Polytechnic Institute
Troy, NY 12180
518 276-6021

Organized: 1979

Host Organization
- Rensselaer Polytechnic Institute

Dr. Leo Hanifin, Director

Dr. Robert Messler, Associate Director/Technical Director
Mr. Charles Rancourt, Assoc. Director, Corp. Relations and Bus. Mgmt.

Technical areas include computer integrated manufacturing, metrology and vision systems, automated assembly, electronics manufacturing, nondestructive evaluation, sensing and control systems, advanced materials and materials processing, process modeling and simulation.

The center, organized in 1979, is comprised of 21 full-time employees, 40 faculty affiliates, 148 students, and eight to ten engineers in residence (CIM). The goal is to develop and apply advanced technologies to the manufacturing arena through the placement of industrially sponsored manufacturing research and development projects on campus, and to provide a vehicle for students to solve relevant problems in manufacturing.

The 1988 budget of $3.8 million is 85 to 90 percent industry funded. The remainder comes from Federal Government and New York State sources.

The center offers a structured manufacturing internship program with research assignments that provide programmatic and project experience. Noncurricular satellite broadcasts of seminars are available for updating client staff.

Publications consist of brochures and a newsletter "CMP News".

Facilities: 13 labs

Facilities Total: 15,000 sq. ft. high bay

Center for Manufacturing Research and Technology Utilization (CMRTU)
Box 5077
Tennessee Technological University
Cookeville, TN 38505
615 372-3362

Organized: 1984

Host Organization
- College of Engineering, Tennessee Tech University
Sponsor(s)
- State of Tennessee

Dr. Joseph T. Scardina, Director

Dr. Ted S. Lundy, Associate Director

Ms. Darlene B. Wiegand, Administrative Secretary

The center's research activities are conducted in four interrelated areas: analysis and testing of materials and components; computer-aided engineering; manufacturing processing and productivity; and system theory and instrumentation. In addition to research operations, the center also carries out funded projects for industry and government sponsors, seminars, workshops and short courses for practicing engineers in manufacturing industries.

Organized in 1984, the center's mission is twofold: to advance scientific and engineering knowledge in advanced manufacturing technology and to support the instructional program in manufacturing related areas. The center's work focuses on helping industries use developing technologies in manufacturing operations. Center projects and laboratories provide students with a chance to gain "real-world" experience in their academic field. The center is composed of five full-time faculty, 12 full-time staff, 45 graduate students and 24 associate faculty.

The center's annual budget is approximately $2.5 million, with about $1.5 million from state funding and the balance from external sources.

Literature describing the cehter's activities in more detail is available upon request.

Facilities: CAE Lab, CAM Lab, Fan Research Lab, Machine Dynamics Measurement Lab, Materials Science Lab and the Robotics Research Facility.

Facilities Total: 20,000 sq. ft.

Center for Materials and Advanced Manufacturing (CMAM)
209 EMRO
College of Engineering
University of Utah
Salt Lake City, UT 84112
801 581-8388

Organized: 1987

Host Organization
- University of Utah

Dr. Joel Dubow, Director

Dr. Ron Sordon, Staff

Technical areas include ceramics, composites, hazard materials, and machining and welding of polymers.

The center was organized in 1987. Its goal is to produce technological innovation and provide technology transfer out of the laboratory to the manufacturing environment. The organization consists of a faculty pool of nine individuals, 23 students, and one full-time staff member.

Funding yearly is in the amount of $5.5 million, divided 60 percent Federal Government and 40 percent industry.

Descriptive brochures are available.

Facilities Total: 25,000 sq. ft.

Center for Materials Fabrication (CMF)
505 King Avenue
Battelle Columbus Division
Columbus, OH 43201-2693
614 424-5828

Organized: 1983

Host Organization
- Battelle - Columbus Division
Sponsor(s)
- Electric Power Research Institute

Dr. William B. Campbell, Director

Key technologies include induction, infrared, microwave and radio frequency.

The center was established in 1983 to assist the materials fabrication industry in implementing cost effective and energy efficient technologies. Areas of concentration are the plastics, ceramics, composites, metals and wood industries. The center conducts applications development projects, which are cofunded with industry. It disseminates publications, videos, and other communications materials to industry through electric utilities.

The center is funded by the Electric Power Research Institute and is managed by Battelle in Columbus, Ohio.

Brochures are available.

Facilities: Battelle Laboratory, Edison Welding Institute,The Ohio State University, and the University of Texas.

Center for Materials Formability and Processing Science (CMFPS)
Stanford Institute for Manufacturing & Automation
School of Engineering
Stanford University
Stanford, CA 94305-4028
415 723-9038

Organized: 1984

Host Organization
- Stanford Institute for Manufacturing and Automation (SIMA)
- Stanford University

Prof. Alan K. Miller, Director

New materials developed for use with existing forming processes(i.e. ultrafine-grained aluminum and ultrahigh-carbon steels for superplastic forming); innovative new forming processes developed for use with existing materials (i.e. die-less forming of thermoplastic matrix graphite fiber composites); new techniques developed for monitoring of materials during manufacturing processes(i.e. fluorescence for characterizing the structure of polymers, and microindentation for characterizing the mechanical properties of electronic device materials).

The center was organized in 1984. Its goal is to understand and improve manufacturing operations involving the forming and processing of innovative materials. Primary emphasis is placed on polymer-matrix and metal matrix composites, ceramics, materials for electronic devices, and structural alloys. The organization consists of 6 faculty members, 1-1/3 support staff, 35 graduate students, and 2 post-doctoral students. The faculty making up CMFPS composes one of the strongest groups in the U.S. investigating mechanical behavior of solids and polymers.

The use of computer models in materials forming and processing is a major theme of this center. Numerous computer codes for predicting deformation and fracture behavior have been developed. The center has produced 45 PhD and Engineering Degree graduates.

Publications include a yearly status report, a regular newsletter, and a list of SIMA publications.

Facilities: 30,000 sq ft in Materials Science and Engineering Dept.,
35,000 sq ft in the Center for Materials Research

Facilities Total: 65,000 sq. ft.

Center for Nondestructive Evaluation
The Johns Hopkins University
Maryland Hall 102
Baltimore, MD 21218
301 338-6115

Organized: 1985

Host Organization
- Johns Hopkins University

Dr. Robert E. Green Jr., Director

Dr. Kenneth C. Blaisdell, Staff
Dr. Martin W. Donner, Staff
Dr. Richard J. Johns, Staff
Dr. John C. Murphy, Staff
Dr. Theodore O. Poehler, Staff
Prof. Moshe Rosen, Staff
Prof. William N. Sharpe Jr., Staff
Dr. Vincent Sigillito, Staff
Prof. James W. Wagner, Staff
Prof. C. Roger Westgate, Staff

Technical areas include advanced sensors, process control, measurement science for microelectronics, life cycle management, artificial intelligence, and intelligent manufacturing.

The center, organized in 1985, is pursuing the goal to increase American competitiveness by developing advanced sensors and systems to improve process control in manufacturing processes and life extension for existing structures. The center provides liaison between the university and the industrial and government sponsors. The organization consists of 37 faculty or senior staff members and a large number of graduate students.

Publications include a quarterly newsletter "CNDE News", an annual report, and numerous technical reports and publications.

Center for Occupational Research and Development (CORD)
601-C Lake Air Drive
Waco, TX 76710
817 772-8756

Daniel M. Hull, President

Jim Lovett, Staff
Leno Pedrotti, Staff

CORD is a public-service, nonprofit organization dedicated to the advancement of vocational and technical education. The center is involved in the design and development of curricula in advanced technologies and applied academics. CORD's curricula may be used with secondary and postsecondary students, as well as adult workers.

In addition to creating instructional materials, the organization conducts applied research, helps form networks and partnerships, and provides teacher workshops, consulting and coordination services.

Annual catalog and descriptive brochure available.

Center Number: 53

Center for Productivity Enhancement
One University Avenue
Lowell, MA 01854
508 452-5000 Fax: ext. 2693

Organized: 1986

Host Organization
- University of Lowell

Pat Krolak, Director

Richard Miner, Research Manager

Technical areas include intelligent robotic control, intelligent design (CAD), imaging, automated factory integration, industrial technology, work environment, composites graphics and design, plating and composites.

The center, organized in 1986, has six full-time staff members and 40 faculty and graduate students. Their goal is to help or assist Massachusetts based industries to improve productivity in manufacturing.

They receive support from the state, local industry, contracts and grants.

Publications include a brochure.

Facilities Total: 2,000 sq. ft.

Center for Reliability and Quality (CRQ)
Department of Mechanical Engineering
3209 Merrill Engineering Building
University of Utah
Salt Lake City, UT 84112
801 581-3851

Organized: 1987

Host Organization
- University of Utah

Sponsor(s)
- Federal Aviation Administration; National Science Foundation; U.S. Air Force

Dr. David Hoeppner, Director

Dr. Yoichi Matsumoto, Associate Director

Technical areas include metrology, product liability, product failure, and reliability.

The center was organized in 1987. Its goal is to commercialize technology and prepare systems created in these areas for productive application. The organization consists of 13 faculty members, 12 students, and two full-time staff members.

Funding in the amount of $1.5 million is provided by industry (75 percent) and government (25 percent, AF, FAA, NSF).

Descriptive brochures are available.

Facilities Total: 12,000 sq. ft.

Center for Research on Electro-Optics and Lasers (CREOL)
12424 Research Parkway
University of Central Florida
Orlando, FL 32826
407 658-6800

Organized: 1986

Host Organization
- University of Central Florida
Sponsor(s)
- State of Florida

Dr. M.J. Soileu, Professor and Director of CREOL

Dr. Mike Bass, Staff
Dr. Glenn Boreman, Staff
Dr. Luis Elias, Staff
Dr. Karl Gunther, Staff
Dr. Dave Hagan, Staff
Dr. Jin Kim, Staff
Dr. Alan Miller, Staff
Dr. Ronald Phillips, Staff
Dr. Erik Van Stryland, Staff

Technical areas include thin films, classic optical systems, nonlinear optics, laser physics, laser engineering, laser propagation, optical switching, sensor protection, metal vapor lasers, diode pumped lasers, solid state lasers, optical parametric oscillators, photo retraction, laser damage to metals and growth of laser materials.

The center organized in 1986, is pursuing the goal to establish a comprehensive research and education program in optics and lasers. The organization includes 12 tenure faculty, 12 research faculty, six support staff members and 30 graduate students.

Sustaining funding of $2.4 million yearly is provided by the State of Florida. Research grants add another $500,000 and $5 to $6 million comes from government and industry contracts.

Publications include descriptive hand-out materials and list of faculty members.

Facilities: State of the art laser and optics laboratories, thin film growth, and bulk crystal growth.

Facilities Total: 33,000 sq. ft.

Center for Research in Computer Controlled Automation (CRCCA)
College of Engineering
Kansas State University
Durland Hall
Manhattan, KS 66506
913 532-5606

Organized: 1984

Host Organization
- Kansas State University

Mr. Garth Thompson, Director

Mr. Michael Harnett, Chairman
Mr. Brad Kramer, Associate Director
Mr. John Ulrich, Associate Director

Technical areas include manufacturing, integrated design and assembly, integration of feature based CAD with manufacturing, process planning and scheduling, expert system development, materials-composites, controls and instrumentation, and neural networks.

The center, organized in 1984, consists of 50 faculty associates (mechanical engineering, industrial engineering, electrical engineering, agricultural engineering) and one full-time employee. Their goal is to improve the economic development of the State of Kansas through small manufacturers by transfer of technology from research projects and enhance the quality of research through multidisciplinary research.

A brochure is available.

Facilities Total: 5,000 sq. ft.

Center for Research on Integrated Manufacturing (CRIM)
College of Engineering
University of Michigan
1101 Beale Avenue
Ann Arbor, MI 48109-2110
313 764-6565

Organized: 1979

Host Organization
- College of Engineering, University of Michigan
Sponsor(s)
- State of Michigan

Walton M. Hancock, Director

Robert W. Schneider, Staff

Technical areas include robotics, computer engineering, manufacturing engineering, information systems, sensors, vision, ergonomics, nondestructive evaluations, microelectronics, artificial intelligence, machining, and quality assurance.

The center, organized in 1979, is pursuing the goal to conduct a state of the art research and instructional program in "integrated manufacturing", the technology of product design, manufacturing, testing, management maintenance, servicing, and upgrading. The organization consists of a number of full-time staff members, 40 faculty members, 80 graduate students, and six administrative staff members. Biweekly seminars are conducted during the academic year on subjects related to manufacturing technology.

Funding comes from the State of Michigan, industry, and grants, in the amounts of $17 million and $3.4 million; grossing $20,408,000.

Publications include brochures, annual reports, and research reports.

Facilities Total: 100,000 sq. ft.

Center for Robotic Systems in Micro Electronics
University of California - Santa Barbara
Santa Barbara, CA 93106
805 961-4991

Organized: 1985

Host Organization
- University of Santa Barbara
Sponsor(s)
- Delco; Hughes Aircraft; IMAR; National Science Foundation; Ratheon; SRC; State of California

Susan Hackwood, Director

Geraldo Beny, Staff
George Munson, Staff

Technical areas include color vision, mechatronics including vacuum, robot control theory, cellular robotic control, intelligent elastic robot states, digital motion control, intelligent control, and micro manufacturing.

The center was organized in 1985. Its goal is to advance in technical areas. The organization consists of seven staff technicians, six support staff members, seven faculty members and visiting researchers.

Their funding from NSF is $5 million over 5 years with a goal of becoming self-sustaining. Additional support is through industry (Hughes, SRC, Delco, Raytheon, and IMAR) and the State of California.

Publications include a general brochure.

Facilities: Laboratories and support areas

Facilities Total: 19,000 sq. ft.

Center for Robotics
Florida Atlantic University
College of Engineering
500 NW 20th Street
Boca Raton, FL 33431
407 367-3471

Organized: 1984

Host Organization
- Florida Atlantic University
Sponsor(s)
- State of Florida

Dr. Zvi Roth, Director

Dr. H. Hamano, Staff
Dr. M. Huang, Staff
Dr. Oren Masory, Staff
Mr. Roy Smollett, Staff
Dr. T.C. Su, Staff

Technical areas include robot calibration and metrology, clean room robotics, robot vision and control and multiprocessing in robotics and manufacturing.

The center was formed in 1984 with the goal of conducting basic research in robotics in Florida. The organization includes a full-time engineer, 10 faculty members (four full-time), 10 to 15 graduate students and a number of visiting faculty members and students.

Major funding for the center comes from the State of Florida in an amount exceeding $1 million during the years 1986 to 1989, and additional grants and contracts with local industry.

Publications include a detailed annual report and research papers.

Facilities: Robotics laboratory

Facilities Total: 1,000 sq. ft.

Center for Robotics and Manufacturing Systems (CRMS)
University of Kentucky
College of Engineering
Lexington, KY 40506-0056
606 257-6262

Organized: 1986

Host Organization
- University of Kentucky, College of Engineering
Sponsor(s)
- State of Kentucky

Dr. William A. Gruver, Director

Mr. William C. Marlowe, Manager of Systems Integration

Technical areas include manufacturing processes and factory automation related to flexible machining, surface mount electronic card assembly, rapid prototyping of plastic parts, sensor-based mechanical assembly, and information systems for computer integrated manufacturing.

The center, organized in 1986, consists of approximately 40 faculty members (engineering, business, computer science), 50 graduate students, three full-time research faculty, six advanced technology professionals, and one engineer at an extension center in Owensboro, KY. Their goal is to conduct research relating to manufacturing and to work with manufacturers to solve manufacturing problems.

They have annual funding from the State of Kentucky ($3.2 million per year), $10 million startup funding, and industrial grants on research projects of $500,000.

Publications include a quarterly newsletter, conference brochures, and information package.

Facilities: New six story building to be occupied summer 1989.

Facilities Total: 68,000 sq. ft.

Center for Robotics Automation and Artificial Intelligence (CRAAI)
P.O. Drawer ME
Mississippi State University
Mississippi State, MS 39762
601 325-3260

Organized: 1985

Host Organization
- Mississippi State University
Sponsor(s)
- State of Mississippi

Dr. E.W. Jones, Director

Mr. Stanley Bullington, Staff
Dr. Edwin Ellis, Staff

Technical areas include automation, robotics and artificial intelligence.

The center, organized in 1985, is pursuing the goal to provide research and services to the State of Mississippi businesses and government. The organization consists of 12 faculty members and 20 graduate students.

Funding is provided by the State of Mississippi and contracts.

Brochures are available.

Facilities Total: 5,000 sq. ft.

Center for Teaching and Research in Integrated Mfg. Systems (CTRIMS)
Stanford Institute for Manufacturing & Automation
School of Engineering
Stanford University
Stanford, CA 94305-4028
415 723-9038

Organized: 1984

Host Organization
- Stanford Institute for Manufacturing and Automation (SIMA)
- Stanford University

Sponsor(s)
- 3M; Alcoa; Apple Computer; Bechtel Corporation; Boeing Company; DEC; Douglas; FMC; Ford; General Electric; General Motors; Hewlett-Packard; Honeywell; IBM; Lockheed; UNISYS

Robert Carlson, Director
Charles H. Kruger, Director

Technical areas include education and research as two components of the CTRIMS. It operates the Manufacturing Systems Engineering Masters programs jointly sponsored by the Mechanical Engineering and Industrial Engineering Management Department. The curriculum addresses industry needs for engineers who have acquired a combined management and engineering design education focused on manufacturing. The research program addresses manufacturing systems and management issues.

The center was organized in 1984. Its goal is to address industry's need for engineers who combine management and design education focused on manufacturing. The organization consists of 10 IE/EM faculty members, eight ME faculty members and 30 to 40 graduate students with strong technical background in a wide range of areas.

Funding includes 10 fellowships from Stanford, 11 fellowships funded by employers, and five fellowships provided by SIMA sponsors with matching funds from the SIMA centers.

Publications include a yearly status report, a regular newsletter, and a list of SIMA publications.

Facilities: Facilities include shops and laboratories.

Facilities Total: 6,000 sq. ft.

Center for Technology Transfer and Economic Development
101 ERL
University of Missouri - Rolla
Rolla, MO 65401
314 341-4151

Organized: 1986

Host Organization
- University of Missouri - Rolla

Dean Keith, Director

Ed Raney, Research Associate

John Amos, Staff

Technical areas include direct assistance, training, publications, research, CAD/CAM, flexible manufacturing systems, quality control, expert systems, CIM, FMS.

The center, organized in 1986, has eight part-time employees and access to 300 faculty members and 300 graduate assistants. Their goal is to assist manufacturing, bringing together resources to solve manufacturing problems and increase the rate at which new design and manufacturing technology is utilized; to provide technical engineering assistance and counseling to industries in the area.

Facilities: CIM, production facility for metal cutting.

Center for Welding Research
Department of Welding Engineering
The Ohio State University
190 West 19th Avenue
Columbus, OH 43210
614 292-6841

Organized: 1979

Host Organization
- Ohio State University

Sponsor(s)
- Battelle - Columbus Division; Edison Welding Institute; National Science Foundation; State of Ohio

Dr. David Dickinson, Director

Mr. Jeffery Glazier, Staff

Technical areas include robotics, tracking, sensing, weld solidification, laser welding and heat treating, weld design analysis, nondestructive evaluation, resistance welding automation, micro joining, weldability, special weld process developments, plastics and composites welding, welding in space and underwater welding.

The center was organized in 1979. Its goal is to perform welding research, and to assist in the development of new technology in industry. The organization consists of nine faculty members, two support staff members and 72 graduate students.

Funding is provided by the State of Ohio in the amount of $4.5 million and initial membership fees of $0.5 million (10 member companies). It was established with facilities plus $3 million capitalization. Battelle contributes equipment and staff.

Publications include research project reports and numerous published papers.

Facilities Total: 3,750 sq. ft.

Center of Specialization in CIM
P.O. Box 3028
Valencia Community College
Orlando, FL 32802
407 299-5000

Organized: 1987

Host Organization
- Valencia Community College
Sponsor(s)
- State of Florida High Technology Commission

Dr. Hugh Rogers, Chairman Engineering

Technical areas include CIM, electronic technology, laser/electro optics technology, programmed controls, robotics, system instrumentation, and systems integration.

The goal of the center, organized in 1987, is to train technicians in the programming and operation of automated systems and the use of test equipment. The organization consists of 25 faculty members and four full-time members.

Funding is from the State of Florida High Technology Commission with capital equipment provided by industry and foundations.

Publications include general brochures describing available courses and facilities.

Facilities: Laboratory

Facilities Total: 3,000 sq. ft.

CIM Center
CAD/CAM Center
Oklahoma State University, Tech Branch
Fourth and Mission
Okmulgee, OK 74447
918 756-6211

Organized: 1986

Host Organization
- Oklahoma State University
Sponsor(s)
- State of Oklahoma

Mr. Don Wills, Director

Technical areas include CIM, CAD/CAM, DNC, flexible manufacturing, robotics, program controllers, design for automatic assembly, machine design, and hydraulic/pneumatics.

The center, organized in 1986, consists of five faculty members, one full-time staff member, and 150 students. Their goal is to provide applied research for technology transfer to manufacturers and universities, increase the competitiveness of manufacturers in the State of Oklahoma, and the training of technologically displaced workers.

Their funding is provided by a state grant of $100,000 per year. Private foundations provide $50,000 per year and they have manufacturers support.

Facilities Total: 15,000 sq. ft.

CIM Development Center
Milwaukee Area Technical College
700 West State Street
Milwaukee, WI 53233
414 278-6600

Organized: 1986

Host Organization
- Milwaukee Area Technical College, Technical and Industrial Division
- Wisconsin Vocational Technical, Adult Education System

John Stilp, Director

Greg Holter, Staff

Technical areas within the CIM Development Center include industrial retraining, computerized machining training, develop CIM applications, test feasibility/cost effectiveness of CIM process, test new CIM cellular technology, and plan future product or process requirements.

The center was organized in 1986. Its goal is to provide technical support services to orientate firms on advantages of computer-integrated manufacturing technology, provide graduates with CIM skills, retrain workers, try out CIM applications and afford access to resource materials. The faculty and staff consist of 24 full-time members and 20 adjunct faculty members.

Publications include brochures, course catalog, reprints of general articles and videotape available upon request (414/278-6742).

Facilities: The CIM Development Center and associated labs contain in excess of $14 million worth of equipment.

Facilities Total: 40,000 sq. ft.

Center Number: 68

CIMCenter
Washington University
Campus Box 1220
One Brookings Drive
St. Louis, MO 63130
3 1 726-4444

Organized: 1988

Host Organization
- Washington University

Raymond F. Mohrman, Director

Scott A. Seely, Staff

Technical areas include computer-aided design (CAD), computer-aided engineering (CAE), computer-aided manufacturing (CAM), computer-aided process planning (CAPP), manufacturing and materials management systems (MRPII), statistical process control, flexible manufacturing systems (FMS), automatic indentification, proprietary LANs, and distributed database systems.

The center, organized in 1988, is pursuing a goal in the application of automat· manufacturing technology to industrial problems using established technology. The organization consists of six full-time staff members and a number of faculty members.

Funding comes from a consortium of industrial affiliates, supporting affiliates who provide in-kind hardware and software, and interim funding from Washington University.

Brochures are available.

Facilities: 7,000 sq. ft. laboratory space

Facilities Total: 15,000 sq. ft.

Center Number: 69

Community College Liaison Center
Industrial Technology Institute
Box 1485
Ann Arbor, MI 48106
313 769-4186

Organized: 1987

Host Organization
- Industrial Technology Institute
Sponsor(s)
- Michigan Department of Education

Jim Jacobs, Director

Manufacturing technology transfer is the center's focus. Services include training and training program design, needs assessment, program evaluation and consulting services.

The center, organized in 1987, is pursuing the goal to coordinate activities of ITI with Michigan community colleges. The organization consists of two full-time staff members.

Funding comes from the Michigan Department of Education.

Publications include newsletters, brochures, and periodic reports.

Facilities: Michigan Community College Laboratories.

Computer-Aided Engineering/Factory Automation Center (CAEFAC)
Henry Vogt Building
University of Louisville
J.B. Speed Scientific School
Louisville, KY 40292
502 588-7599

Organized: 1988

Host Organization
- University of Louisville
Sponsor(s)
- State of Kentucky

Donald L. Cole, Director, Assistant Dean

Technical areas include robotics, vision, CNC machining, flexible machining cells, cutting fluid research, injection molding, computer-aided design, manufacturing and testing.

The center was organized in April 1988 as part of the Engineering College. Their goal is to further CAE and CIM in academic programs, support research by faculty, and provide CAD facilities for students.

The funding comes from the State of Kentucky and the private sector.

Publications include a brochure.

Facilities: New building.

Facilities Total: 30,000 sq. ft.

Computer-Integrated Design Manufacturing and Automation Center (CIDMAC)
A.A. Potter Engineering Center - Room 114
Purdue University
West Lafayette, IN 49907
317 494-7715

Organized: 1982

Host Organization
- Purdue University
Affiliate Organization
- Engineering Research Center
Sponsor(s)
- National Science Foundation

Henry T. Yang, CIDMAC, Director

James J. Solberg, ERC, Director, Engineering Research Center

Prof. David Anderson, ME, Research Panel
Prof. Moshe Barash, IE, Research Panel
Prof. R.L. Kashyap, EE, Research Panel
Prof. Gerrold Neudeck, EE, Research Panel

Technical areas include design, planning and controls, processing, transport, communication,sensing and assembly.

CIDMAC was organized in 1982 and ERC in 1985. Their goal is to address a broad scope of manufacturing issues including: future manufacturing capability and responsiveness of intelligent manufacturing systems, and ability to respond promptly and correctly to the manufacturing environment. They have 40 faculty members, 170 students, three professionals, and three clerical staff members.

The $5 million per year funding comes from industrial (40%) and NSF (60%) sources.

Publications include brochures, annual research summary, annual research report, and newsletters.

Facilities: Facilities include a 2,000 sq ft manufacturing laboratory, 2,000 sq ft automation laboratory, and a 10,000 sq ft robotics laboratory

Facilities Total: 14,000 sq. ft.

Computer Integrated Manufacturing Laboratory (CIM LAB)
Lehigh University
H.S. Mohler Building 200
Bethlehem, PA 18015
215 758-4034

Organized: 1974

Host Organization
- Lehigh University
Sponsor(s)
- State of Pennsylvania

Dr. Emory W. Zimmers Jr., Director

Douglas Sunday, Staff

Technical areas include CAD, CAM, design for manufacturing, simulation, and process control software.

The center was organized in 1974. Its goal is to provide a modern educational and research facility and communication pathway for technology transfer to industry. Working in conjunction with the Manufacturing Systems Engineering (MSE) program, the organization consists of 10 full-time staff members, six faculty members and 14 graduate students.

Funding is provided by the State of Pennsylvania, $0.5 million, in-kind $1 million, industry $0.75 million and the Federal Government in the amount of $100 thousand.

Brochures are available.

Facilities Total: 12,000 sq ft.

Computer Integrated Manufacturing System Research Center (CIMSRC)
Engineering Research Center
552
Arizona State University
Tempe, AZ 85287-5106
602 965-3709

Organized: 1980

Sponsor(s)
- Arizona State University

Dr. Dan Shunk, Director

Dr. Charles Backus, Assistant Dean for Research

Technical areas include data base and network communication,CAD/CAM, CAE, expert systems, computer vision, quality assurance, robotics lab, systems simulation lab, and technology transfer lab.

The goal of the center, originating in 1980 and incorporated as a center in 1983, is providing industry with manufacturing technology engineers and performing CIM research. The organization includes 30 faculty members, 75 to 120 graduate students and four full-time professionals.

Sustaining funding, is 45% federal, 40% industry and 15% state with contracts funding totaling approximately $2 to $3.5 million.

Publications include a brochure.

Facilities Total: 17,000 sq. ft.

Computer Integrated Manufacturing Systems (CIMS)
A. French Building, Suite 225
Georgia Institute of Technology
Atlanta, GA 30332-0406
404 894-5562

Organized: 1983

Host Organization
- Georgia Institute of Technology

Dr. Leon F. McGinnis, Director

Dr. Stephen Dickerson, Associate Director, Mechanical Engineering
Dr. Lynwood A. Johnson, Associate Director, Industrial Engineering
Dr. George Vachtsevanos, Associate Director, Electrical Engineering

Technical areas include robotics, vision, controls, material handling, CAE/CAD/CAM, geometric modeling, artificial intelligence, simulation, graphics, flexible automation, production planning, production scheduling and control, human supervisory control, and manufacturing management.

The center was organized in 1983 as a multidisciplinary education program at the graduate level. Ten academic units including engineering disciplines, computer science, and management offer a CIMS certificate. In 1988, 40 faculty members were involved in teaching or research in the CIMS program, over 200 students were enrolled, and approximately 75 certificates were awarded. A full-time staff of three people administer the program.

Funding includes approximately $450,000 per year from the private sector.

Publications include research reports, theses, annual reports, a brochure and a prospectus. Research publications are provided to sponsors.

Facilities: Facilities include the CIMS offices and laboratories for flexible automation, vision, control, and computers in manufacturing.

Computer Integrated Manufacturing Technology (CIM)
School of Technology
Indiana State University
Terre Haute, IN 47809
812 237-3166

Organized: 1985

Host Organization
- Indiana State University, School of Technology
Sponsor(s)
- State of Indiana

Dr. Richard W. Barrow, Chairman Industrial and Mechanical Technology Dept
Mr. Dale Bringman, CNC
Dr. Bruce Dallman, Chairman Manufacturing and Construction Technology
Dr. James Gray, Fluidics
Dr. Larry Heath, Robotics
Dr. Clois Kicklighter, Dean, School of Technology
Mr. Roger Vicroy, Coordinator, Computer Integrated Mfg. Laboratory
Dr. Ron Woolsey, CAD

Technical areas include industrial applications of computers, microelectronics, machine tools, manufacturing processes and materials, plastics technology, plant layout and materials handling, CNC, production planning and control, electronics, power, manufacturing materials, automatic manufacturing systems, work measurement, industrial simulation and systems, CAD and CAM.

CIM was organized in 1985. The goal is to provide hands-on training in advanced technology for industry with on-site applications. Staff includes 20 faculty members and 36 student assistants.

Sustaining funding is derived from the State of Indiana with corporate gifts used for other purposes.

Publications include brochures and a curriculum guide.

Facilities: Laboratory space.

Facilities Total: 10,000 sq. ft.

Consortium for Manufacturing Competitiveness
Southern Technology Council
Southern Growth Policies Board
P.O. Box 12293
Research Triangle Pk, NC 27709
919 941-5145

Organized: 1988

Host Organization
- Southern Growth Policies Board

Affiliate Organization
- Augusta Technical Institute
- Chattanooga State Technical Community College
- Haywood Community College
- Itawamba Community College
- Okaloosa-Walton Junior College
- Oklahoma State University - Okmulgee
- Parkersburg Community College (WV)
- Somerset Community College
- Southern Arkansas University - Technical Branch (AR)
- Tom Bevill Center for Advanced Manufacturing Technology (AL)
- Trident Technical College
- University of Southwestern Louisiana (LA)
- Wytheville Community College (VA)

Stuart Rosenfeld, Director

Technical areas include vocational-technical college assistance to local manufacturers, information network on skills, knowledge, and behavior needed in "factory of the future" and facilitation of innovation.

The center was organized in 1988 and includes one site selected by the chancellor of the two-year college systems of each of thirteen states. Its goal is to demonstrate that two-year vocational-technical colleges can work with small and medium sized manufacturers to facilitate the diffusion and effective use of new technologies and innovations.

Supplemental funding has been provided by the U.S. Department of Education, the Appalachian Regional Commission, the Tennessee Valley Authority and the southern states.

Center Number: 78

Controls and Robotics Lab
Mechanical Engineering Department
University of Idaho - Moscow
Moscow, ID 83843
208 885-7229

Organized: 1987

Host Organization
- University of Idaho

Dean Edwards, Associate Professor
E. Clark Lemmon, Head of M.E.
William Saul, Dean of Engineering

Technical areas include automation, robotics, controls, expert systems, artificial intelligence, process modeling, materials handling, quality control, assembly, composite material processing, and human factors.

The laboratory was established in 1987. The goal is to bring advanced technology and resources to local industry. A core of eight faculty members provides the basic manning capability.

Funding includes state tuition.

Facilities: Laboratory space

Facilities Total: 2,000 sq. ft.

Coopers and Lybrand
Center for Manufacturing Technology
144 Middlesex Turnpike
Burlington, MA 01803
617 229-1021

Organized: 1988

Host Organization
- Coopers and Lybrand

Dr. Irvin Krause, Director

David Asmus, Director of Technical Operations
Len Olin, Director of Manufacturing Consulting Services
John Saladino, Director, Training

Technical areas include CAD, CAM, simulation, robotics, design for manufacturability, design for assembly, total quality control, process planning, technology training, CIM planning, JIT, and cost management.

The center, organized in 1988, has 50 full-time staff members. The goal is to build an integrated training, consulting and research facility to apply advanced manufacturing techniques to the design and manufacture of new products.

Their funding source is industrial.

Publications include brochures.

Facilities: Manufacturing development 8,000 sq ft, CAD facility and training 21,000 sq ft

Facilities Total: 29,000 sq. ft.

Corning Community College
Spencer Hill Road
Corning, NJ 14830
607 962-9243

Organized: 1983

Host Organization
- Corning Community College
Sponsor(s)
- State of New York

Dr. George Gifford, Chairman

Technical areas include robotics, CIM/flexible manufacturing, assembly cell, CAD/CAM, CNC, and APT.

The center, organized in 1983, has a staff of eight faculty members and one full-time employee. The goal is to provide retraining for state secondary and post secondary level teachers, curriculum development, and to provide manufacturing technologists and facilities for local industry.

The funding is derived from grants from the State of New York and industrial seminars.

Publications consist of a brochure describing training programs.

Facilities Total: 15,000 to 20,000 sq. ft.

Center Number: 81

Department of Industrial Cooperation (DIC)
University of Maine - Orono
Boardman Hall
Orono, ME 04469
207 581-2200

Organized: 1983

Host Organization
- University of Maine - Orono

Richard Hill, Director

John Field, Staff
Ray Noddin, Staff
Norman Smith, Staff

Technical areas include robotics, CAD/CAM, statewide auto CAD training, microprocessor design, manufacturing engineering technology, and flexible manufacturing.

The center, organized in 1983, is pursuing the goal to provide trained manufacturing technologists, information, and research support for Maine business and industry. The organization consists of four staff members, 100 faculty members and 50 graduate students.

Funding is provided in the amounts of $1 million and $400 thousand annually.

Brochures are available.

Facilities: Robotics center, instrumentation center, and additional facilities are pending.

Edison Industrial Systems Center
1700 North Westwood Avenue
Suite 2286
Toledo, OH 43607-1207
419 531-8610

Organized: 1986

Host Organization
- Edison Industrial Systems Center

Charles Depew, President
Ann Hosman, Vice President, Marketing
Tony Struckholz, Vice President, Finance
Lionel Sully, Ph.D., Vice President, Technology

Technical areas include integration of industrial systems, data of technology resources, phase modeling, quality control, machine vision, and industrial computerized X-ray tomography.

The center, organized in 1986, consists of 10 full-time employees. The mission of the center has become to conduct member-driven industrial systems research and development to enhance the industrial competitiveness and economic development of industries in Ohio. It strives to link the needs of industrial members with academic research then disseminates this to members for application.

They have 10 to 12 university contracts. Edison has $4 million startup money from Ohio's Thomas Edison Program and $4 million from industry in the form of contracts.

Publications include brochures and other publications.

Facilities Total: 7,000 sq. ft.

Center Number: 83

Edison Materials Technology Center (EMTEC)
3171 Research Boulevard
Kettering, OH 45420
513 259-1365

Organized: 1987

Host Organization
- Case Western Reserve, Cleveland OH
- Central State University, Wilberforce OH
- Hocking Technical College, Athens OH
- Ohio State University
- Ohio University, Athens OH
- Sinclair Community College, Dayton OH
- University of Cincinnati, Cincinnati OH
- University of Dayton
- Wright State University, Dayton OH

Ernest F. Moore, Director

Percy J. Gros, Staff
Brian K. Howard, Staff

Technical areas are defined and coordinated by member organizations to ensure that industry's most pressing problems are addressed. Representative cooperative projects include: Material and process selection, casting porosity in metals, fabrication of wire or ribbon superconductor materials, near net shape metal forming, metals surface finishing, source materials criteria and acceptance testing. Proprietary research is designed to meet company-specific needs.

The center was organized in 1987. The goal of the center is to remove those technological impediments to competitiveness faced by industry in the areas of source materials and unit processes. This is achieved by finding or developing innovations in technology based on industry defined needs. The solutions to problems are provided through services, application of existing technology, and advanced technology development projects.

A balance between industry, government, and academic institutions is reflected in the nine Ohio universities and five major government laboratories that are joined with a rapidly growing list of industry memebers of the not-for-profit consortium.

Brochures are available.

Facilities: Facilities include access to the Wright Aeronautical Lab (AFWAL), Mound Laboratories (DOE), and projects from other federal labs.

Center Number: 84

Engineering Research Center (ERC)
University of Maryland
College Park, MD 20742
301 454-7941

Host Organization
- University of Maryland - College Park

Dr. Herb Rabin, Director

Dr. Dave Barbe, Executive Director

Dr. Charles Heller, Staff
Mr. Norman Schiff, Staff
Mr. Travis Walton, Staff

Four principal programs further university-industry cooperation:(1) Technology Extension Service (TES) - five offices in Maryland provide on-site technical assistance to businesses in the state. (2) Technology Advancement Program (TAP) - provides business and technical support for startup companies. (3) Technology Initiatives Progam (TIP)- promotes development of research capabilities within the University in areas of industrial relevance. (4) Maryland Industrial Partnership (MIPS) - establishes industry-university cooperative research projects.

The ERC was established to promote interaction in engineering and science between the University of Maryland and the business community. Operating across the technical components of the University, the center promotes cooperative research projects and focuses the University's resources on the needs of the industrial community.

Publications include various brochures describing capabilities and programs, and comprehensive annual reports.

Facilities: Several research laboratories operated: two technically-oriented start-up incubators and five technology extension offices.

Engineering Research Center for Near Net Manufacturing
339 Baker Systems Building
Ohio State University
1971 Neal Avenue
Columbus, OH 43210-1271

Organized: 1986

Host Organization
- Ohio State University
Sponsor(s)
- National Science Foundation

Prof. Taylan Altan, Director

Dr. Richard Bailey, Staff
Prof. R.A. Miller, Staff

Technical areas include die casting, hot and cold forging, sheet metal forming, injection molding, processing of polymers and composites, and die design and manufacturing.

The center was organized in 1986 with the goal to improve the development of parts to close tolerances and without scrap. The organization consists of seven full-time staff members, 15 faculty members and 40 graduate students.

Funding is provided by NSF in the amount of $1.5 million per year and through industry, 50 members, for $0.6 million per year.

Publications include brochures, technical reports, papers and newsletters.

Facilities: 10,000 sq ft high bay area, 13,000 sq ft low bay, CAD/CAM/CAE software/hardware, injection molding, die casting, CNC die machines, model mfg

Facilities Total: 23,000 sq. ft.

Center Number: 86

Engineering Research Institute (ERI)
Engel Laboratory
Department of Mechanical Engineering
Iowa State University
Ames, IA 50011
515 294-1423

Host Organization
- Iowa State University
Sponsor(s)
- Engel Family; National Science Foundation

Jim Bernard, Department Chairman
Jerry Hall, Laboratory Director

The Engel Laboratory is a new facility of the Department of Mechanical Engineering dedicated to the integration of design and manufacturing. The facility includes eight PS/2 design terminals running AutoCAD, a large N/C mill, a flexible manufacturing cell and a welding robot. A turning center is on order. The facility currently services undergraduate and graduate classes and several research projects.

Funding for the laboratory comes from a large endowment funded by the Engel family and from the National Science Foundation.

Engineering Research Institute (ERI)
Robotics Laboratory
Department of Industrial Engineering
212 Marston Hall
Ames, IA 50011
515 294-1684

Organized: 1986

Host Organization
- Iowa State University
Sponsor(s)
- State of Iowa

Prof. Don Eichner, Staff
Prof. John Even, Digitized vision systems
Prof. Richard Linn, Staff
Keith McRoberts, Chairman, IE Department

Technical areas include flexible manufacturing cell, control cycles, precision assembly, material handling.

Organized in 1986, the goal is to promote research and facilitate interaction between faculty and the business/government community. Staff members include four professionals.

Funding is from the State of Iowa and grants.

Publications consist of generic brochures.

Facilities: Facilities include two laboratories: a machining cell and a robotic vision laboratory.

Facilities Total: 2,000 sq. ft.

Center Number: 88

Engineering Systems Research Center
University of California, Berkeley
3115 Etcheverry Hall
Berkeley, CA 94720
415 642-4993 Fax: 415 643-8982

Organized: 1986

Host Organization
- Univeristy of California, Berkeley

David Dornfeld, Director

A. Agogino, Program Coordinator, BEST
D. Bogy, Program Coordinator, LCM
W. Jewell, Program Coordinator, RRQD
R. Leachman, Program Coordinator, PALS
Steven Owen, Administrative Assistant
M. Tomizuka, Program Coordinator, RAMP/LMA

Technical areas include Robotics, Automation Manufacturing Program (RAMP); Laboratory for Computer Mechanics (LCM); Laboratory for Manufacturing Automation - sensors, machining (LMA); Berkeley Expert System Technology Laboratory (BEST); Risk, Reliability, and Quality Decision (RRQD); and Production and Logistics Systems (PALS). Areas of interest include manufacturing processes and systems, systems economics, dynamic systems analysis and control, production and distribution planning, risk/decision analysis, reliability/quality control and forecasting.

The goal of the center, organized in 1986, is to provide an interdisciplinary center for the study of engineering systems, addressing challenges to manufacturing productivity by coordinating faculty from different disciplines on joint projects with industry. The organization includes three full time-staff members, 30 faculty members and 50 graduate students.

The yearly budget of the center is approximately $1 million.

Publications include center brochures, RAMP and LMA brochures, and a report series of faculty publications.

Facilities: 4,000 sq ft center and 20,000 sq ft of laboratory space.

Facilities Total: 24,000 sq. ft.

Center Number: 89

Enhancement of Productivity and Innovation Center (EPI CENTER)
Department of Industrial Technology
University of Northern Iowa
Cedar Falls, IA 50613
319 273-2561

Organized: 1989

Host Organization
- University of Northern Iowa
Sponsor(s)
- State of Iowa

Dr. Doug Pine, Director

Dr. Mohammed Fahmi, Department Head
Dr. Scott Helzer, Coordinator

Technical areas include robotics, CNC-APT, materials handling, machine vision, speech recognition and synthesis.

The center is planned for startup in 1989-1990. The goal is to provide specialized training programs offered on-site and research projects with local companies. The staff consists of 16 faculty members.

Funding comes from the State of Iowa and industrial research grants.

Publications include catalogs and program brochures.

Center Number: 90

Environmental Research Institute of Michigan (ERIM)
P.O. Box 8618
Ann Arbor, MI 48107
313 994-1200

Organized: 1972

Host Organization
- University of Michigan

Dr. William M. Brown, Director

Dr. Jack L. Walker, Executive Vice President

Technical areas include machine vision, automated inspection, weapons vision applications, and robot guidance.

The Institute, organized in 1972, consists of 700 full-time staff members and several University of Michigan faculty members. Their goal is to develop technology to improve the quality of defense posture and to service the R&D requirements of the business community.

It is a not-for-profit $60 million organization.

Publications include a calendar.

Facilities Total: 300,000 sq. ft.

Center Number: 91

Gear and Bearing Center
IIT Research Institute
10 West 35th Street
Chicago, IL 60616-3799
312 567-4200

Organized: 1988

Host Organization
- IIT Research Institute
- Illinois Institute of Technology

Dr. Maurice A. H. Howes, Director

Dr. Keith E. McKee, Director, Manufacturing Department
Ms. Therese M. Philippi, Center Business Analyst

Technical areas include gear and bearing metallurgy, design of gear and bearing functions in components, lubrication and life characteristics of materials and surface treatments, special application alloys, near net shape processes for gear and bearing manufacture, direct hardening by induction and electron beam, laser hardening, work material and data handling.

The center, organized in 1988, has a full-time professional staff plus supporting technical staff. The goal of the center is to help domestic manufacturers improve and modernize gear and bearing manufacturing capabilities. Benefits are improved quality, shorter lead times, reduced materials consumption and greater competitiveness in the world marketplace.

Publications include a newsletter, brochures, annual report, research reports, data base and literature searches.

Facilities: Facilities include materials and manufacturing laboratories and access to specialized analytical and process laboratories.

Facilities Total: 5,000 sq. ft.

Center Number: 92

Greater New Haven State Technical College
88 Bassett Road
North Haven, CT 06473
203 234-3328

Organized: 1977

Host Organization
- Greater New Haven State Technical College
Sponsor(s)
- State of Connecticut

William Celotto, Department Chairman Manufacturing Engineering Tech
Dominic Longo, Associate Dean of Instruction

Technical areas include associate degree programs in manufacturing engineering technology and mechanical engineering technology. N/C programming and contract training on-site or in the college.

The center was organized in 1977. Its goal is to provide trained manufacturing technologists, experienced on-site training programs and advanced automation assistance to local industry. The organization consists of five faculty and one clerical staff member.

Their funding comes through the State of Connecticut.

Publications include the college catalog describing manufacturing technology related courses.

Center Number: 93

Indiana Vo-Tech - Region 13
343 Spring Street
Jefferson, IN 47131
812 288-2670

Organized: 1983

Host Organization
- Indiana Vocational-Technological
Sponsor(s)
- State of Indiana

Steve Prather, Staff

Technical areas include automated manufacturing technology, CAD technology.

The center was organized in 1983. This center is representative of the thirteen affiliated State of Indiana Vo-Tech Colleges. Each center has developed areas of specialization that correspond to the manufacturing emphasis of businesses in the local community. Staff includes one full-time and four part-time staff members. Their goals are to provide students with vocational and industrial training and to work with industry to develop specialized manufacturing processes, with emphasis upon the needs of local special industries.

Sustaining funding is derived from the State of Indiana, corporation donations, and gifts supporting special projects in technology transfer and on-site training.

Publications include catalog, program specific pamphlets, and program guide.

Center Number: 94

Industrial Affiliates Program
COINS Department, LGRC Building
University of Massachusetts
Amherst, MA 01003
413 545-2475

Host Organization
- University of Massachusetts

Sponsor(s)
- Department of Defense; National Science Foundation; U.S. Air Force; U.S. Navy

Paul McOwen, Director

W. Richards Adrion, Department Head
Victor Lesser, Staff
Edward Riseman, Staff

Technical areas include parallel processing, parallel architecture, computer vision, robotics, memory organization and inferences, sophisticated control, intelligent interfaces, learning and knowledge applications, natural language understanding, knowledge acquisition, autonomous mobile vehicles, tactical planning and robots, associated parallel architecture, data base and information retrieval, intelligent user interface, knowledge based multiprocessing programs, neural nets, high speed communication nets, case-based reasoning, and connectionism.

Staff members include 25 full-time post doctoral research scientists, 35 technicians, 30 faculty, 200 graduate students, and 175 undergraduate students. Their goal is to develop very large systems to solve large problems that cannot be managed elsewhere, e.g., spacestation or manufacturing technology, with a kernel for process control.

They have a total funding of $9 million per year from DoD, NSF, AF, Navy and industry. COINS is a top-funded computer science research program among public universities. The department is designated by DoD University Research Initiatives Program as one of only two "Centers of Excellence in A.I." nationally. A new center has been established recently by COINS to facilitate technology transfer to industry.

Publications include technical report series, catalog, journal, articles, over 300 reports per year.

Facilities Total: 70,000 sq. ft.

Center Number: 95

Industrial Extension Service
Box 7902
North Carolina State University
Raleigh, NC 27695-7902
919 737-3262

Organized: 1955

Host Organization
- North Carolina State University College of Engineering Department
Sponsor(s)
- State of North Carolina

Daniel E. Harrell, Director, Eng. Ext. Education
Thomas W. Stephenson, Director, Ind. Ext. and Applied Research

Robert L. Edwards, Supervisor, Technical Services
M.M. Fikry, Administrator, Graduate Video Education Program
Marvin R. Sparks, Supervisor, Industry Liaison

Technical areas include automation issues, cost justification, robotics application, production control systems, quick changeover techniques, quality systems, total systems quality control, customer imposed quality, CAD/CAM systems, hazardous waste and process controls, energy, inventory control, and energy audits.

The center, organized in 1955, is pursuing the goal to bring engineering faculty and facilities to bear on problems in industry to transfer technology via technical assistance, information dissemination, continuing education programs, demonstrations, and graduate engineering education. The organization consists of 20 professionals, 18 staff members, and supported by 200 faculty members and 20 to 25 students.

Funding is provided in a number of ways: State of North Carolina $1 million per year, revenues and fees $1 million per year, applied research and service contracts $750,000 per year.

Publications include applied engineering books; metalworking, plastics and engineering service directories and a catalog of services.

Center Number: 96

Industrial Innovation Laboratory
Department of Mechanical Engineering
University of Kansas
Lawrence, KS 66045
913 864-3181

Organized: 1980

Host Organization
- University of Kansas

Sponsor(s)
- National Aeronautics and Space Administration; National Institute of Standards and Technology (NIST); State of Kansas; U.S. Navy

B.G. Barr, Director

Terry Saddis, Associate Director

Technical areas include intelligent machinery systems, microprocessor and software devices, and process planning.

The center was started by NASA in 1980, with CIM research initiated in 1983 and augmented telerobotics in 1988. The center includes two full-time faculty members and 20 graduate students. Their goal is to train graduate students with expertise in design of intelligent machines and provide technology transfer to firms in Missouri, Nebraska, Oklahoma, and Kansas.

They have a $400,000 budget with funding coming from industry, the State of Kansas and the Federal Government (NASA, NIST, and Navy).

Brochures are available.

Facilities: CIM laboratory (robot, CNC vertical mill, Smart fixture and Sun-IV workstation), and an augmented telerobotics laboratory.

Facilities Total: 6,000 sq. ft.

Industrial Research Institute (IRI)
1550 M Street, NW
Washington, DC 20036

Organized: 1945

Host Organization
- Industrial Research Institute

Charles F. Larson, Executive Director

Specific manufacturing technology research areas include conferences and roundtables on reliability of advanced ceramics, wear life prediction of mechanical components, quality/process control R&D, management of computers in R&D, industrial innovation case histories, and managing innovation.

Industry recognizes that research and development are indispensable to the security and progress of a nation. Concern for improvement of the environment, conservation of resources, and a better life for all mankind underlie the importance of research. The goals of IRI are to promote, through the cooperative efforts of its members, improved, economical, and effective research, including means for more effective interaction with other corporate functions.

Membership in IRI is taken in the name of the subscribing company with annual dues of $2100. Members must maintain an industrial research staff and laboratory in the United States and be engaged in industrial production. Total annual revenues are $2 million obtained from dues, seminars, meetings, study groups, tutorials and publications.

Originally an integral part of the National Research Council. In 1945 IRI was incorporated as an independent nonprofit membership corporation.

Publications include newsletters, special reports, audio cassettes, and a bimonthly journal, "Research Technology Management".

Center Number: 98

Industrial Technology
College of Engineering and Technology
Southern Illinois University
Carbondale, IL 62901
618 536-5545

Organized: 1943

Host Organization
- Southern Illinois University

Dr. James P. Orr, Director

Dr. Paul E. Andrews, Materials Handling and Plant Layout
Dr. Dale H. Besterfield, Quality Control
Dr. Robert R. Ferketich, Manufacturing Processes
Prof. Fred E. Meyers, Motion and Time Standards
Dr. James P. Orr, Industrial Management
Dr. Abhay Trivedi, CAM/Robotics

Technical areas include all subjects leading to a BS degree in industrial technology with specialization in manufacturing; an MS degree in manufacturing systems is also offered.

The program began in 1943 with the goal to train and educate men and women for positions in manufacturing management. The overall staff includes seven industrial technology tenure positions, 30 faculty members, 40 staff members, 1200 students off campus, 200 on campus.

Additional funding comes from off-campus courses presented to companies including Illinois Power, 25 military installations and local industries.

Publications include brochures and a course catalog.

Facilities: State of the art robotics and CAD laboratory and a large processes laboratory.

Industrial Technology Institute (ITI)
2901 Hubbard Road
P.O. Box 1485
Ann Arbor, MI 48106
313 769-4000

Organized: 1982

Host Organization
- University of Michigan
Sponsor(s)
- State of Michigan

George Kuper, President

Dr. Louis Tornatzky, Director

Bill Loomis, Senior Marketing Specialist
Richard Macan, Government Marketing

Technical areas include manufacturing systems, factory control, design for manufacturing, automatic inspection and monitoring, manufacturing economics and strategy, training and technical assistance, distribution factory control, manufacturing systems development, and information services.

The Institute, organized in 1982, has 170 staff members, and 50 part-time employees. The goal is to enhance the productivity and competitiveness of American industry with the generation of new knowledge and technology.

Their funding is $11 million per year, 50 percent from project contracts, foundation grants, endowments, and consortiums.

Publications consist of brochures.

Facilities: Highbay

Facilities Total: 20,000 sq. ft.

Institute for Manufacturing and Automation Research (IMAR)
University of Southern California
University Park
OHE 530L
Los Angeles, CA 90089-1450
213 743-0884

Organized: 1987

Host Organization
- Arizona State University
- CalTech
- University of California - Irvine
- University of California - Santa Barbara
- University of California at Los Angeles
- University of Southern California

Sponsor(s)
- National Science Foundation; State of California

Dale Hartman, Executive Director

Technical areas include research - joint efforts of industry and education, education - undergraduate, graduate and continuing, technology transfer - production equipment and manufacturing capabilities for CIM, MAP for public demonstration at a Science Museum, systems level research, training in operation of intelligent machines.

The center was organized in March 1987 with the goal to improve manufacturing efficiency and industrial competitiveness of member companies. The organization consists of numerous staff and faculty members in six universities.

Support for the center comes from industry - $100,000 per year for 3-year commitments from six members and 12 others, with an additional $2 million from NSF and $200,000 State of California support.

Brochures are available.

Facilities: Facilities include access to laboratories at all participating universities.

Center Number: 101

Institute for Robotics and Intelligent Systems (IRIS)
Powell Hall, Room 204
University of Southern California
Los Angeles, CA 90089-0273
213 743-5516

Organized: 1986

Host Organization
- University of Southern California

Dr. George Bekey, Robotics
Prof. Rom Nevatia, Staff
Dr. Aristides Requicha, CAD

Technical areas include computer vision, robotics and intelligent machines, object recognition, CAD, dexterous hands, task planning, automated manufacturing, perceptual robotics, sensor safety and distributed artificial intelligence.

The center was organized in 1986 and is pursuing the goal to build intelligent systems. The organization includes 15 faculty members, 50 graduate students and a number of full-time support staff members.

Funding for the center is approximately $2 million from federal and industrial sources.

Publications include detailed brochures describing curriculum offerings, staff resumes, and facilities.

Facilities: Distributed AI, robotics research, programmable automation, brain simulation, computer vision, production systems, and human factors labs.

Center Number: 102

Institute of Advanced Manufacturing Sciences (IAMS)
Technical Center
1111 Edison Drive
Cincinnati, OH 45216
513 948-2000

Organized: 1982

Host Organization
- Institute of Advanced Manufacturing Sciences

Joseph A. Steger, Chairman of the Board

Charles F. Carter, Jr., Executive Director

John B. Kohls, Director, Technical Center
Paul R. Warndorf, Manager, Engineering

Technical areas include facilities planning, quality, scheduling, production control, inventory control, process technologies, machine development, micromechanical/microstructure prototyping, artificial neural network technology, electrical discharge machining, and other nontraditional manufacturing processes.

IAMS was founded in 1982 to help solve manufacturing problems and increase the rate at which new manufacturing technology is applied in the workplace. Three primary delivery mechanisms have been created to bring services to the manufacturer: contract research and development projects - for individual clients and groups; an industry membership program which offers a package of services aimed particularly at the smaller manufacturer; and technology transfer programs such as conferences, demonstrations, and training sessions.

IAMS draws on its own full-time technical staff of approximately 20 and on the resources of the University of Cincinnati and its technical colleges, as well as other manufacturers and industry consultants.

Publications include articles for trade publications, capabilities document, periodic newsletter, annual report and special program announcements (for lecture series, roundtable discussions, conferences.

Facilities: Two-level Technical Center with a 9,000 sq ft highbay area, and seven 1,000 sq ft labs, plus technology transfer facilities.

Facilities Total: 64,000 sq. ft.

Center Number: 103

Institute of Robotics and Automated Systems
Lehigh University
Mohler Building 200
Bethlehem, PA 18015
215 758-4036

Organized: 1982

Host Organization
- Lehigh University
Sponsor(s)
- State of Pennsylvania

Nicholas Odrey, Director

Technical areas include workstation cell controller, process control, robots in construction, utility industry applications, robot programmer engineering, vision systems, sensing, and senior reliability.

The center was organized in 1982. It goal is to be a recognized center of excellence for robotics and automated systems in research and education and to foster technology transfer. The organization consists of 24 full-time staff members, 22 faculty members, and 30 graduate students.

Federal funding is provided along with the State of Pennsylvania, and a consortium of industry in the amount of $5 million.

Brochures are available.

Facilities: Robotics (teaching) 600 sq ft, main laboratory 1,800 sq. ft.

Facilities Total: 2,500 sq. ft.

Center Number: 104

Integrated Manufacturing Systems Engineering Institute (IMSEI)
North Carolina State University
Raleigh, NC 27695-7915

Organized: 1984

Host Organization
- North Carolina State University, College of Engineering

Dr. Carl F. Zorowski, Director

Hans Berger, Ind. Liaison Rep. Northern Telecom, Inc.
Wayne Friedrich, Mfg. Tech. Specialist, Ind. Extension Service
Betty Warren, Institute Secretary

Institute offers multidisciplinary master's degree in integrated manufacturing systems involving mechanical, industrial, electrical, computer science and economics discipline subject matter.

The center, organized in 1984, pursues a threefold mission of graduate education, basic and applied research and technology transfer in modern manufacturing systems technology through a cooperative interaction with industry. The organization consists of 20 associated faculty members and more than 60 students.

Funding is shared by private industry and the university, with an annual budget of $750,000.

Publications include Institute prospectus, research program descriptions and project report abstracts.

Intercollegiate Research and Technical Institute
Eastern Washington University
Cheney, WA 99004
509 359-6200

Organized: 1990

Host Organization
- Community Colleges of Spokane
- Eastern Washington University
- Gonzaga University
- Washington State University
- Whitworth College

Wayne Elinger, Spokane Community College
John Ringo, Washington State University
Hugh Sullivan, Eastern Washington University
Jerry Tucker, Gonzaga University

The center will be organized in 1990-1991. Its goal will be to locate a research and technology institute in Spokane to support the growth and development of high technology industry in the Spokane region.

A proposal has been published.

Center Number: 106

Laboratory for Manufacturing and Productivity (LMP)
MIT 35-136
77 Massachusetts Avenue
Cambridge, MA 02139
617 253-2234

Organized: 1977

Host Organization
- Massachusetts Institute of Technology, School of Engineering

Sponsor(s)
- Defense Advanced Research Projects Agency; National Aeronautics and Space Administration; National Science Foundation; U.S. Navy

David Hart, Director

Sally Burns, Assistant Director

Steven Dubowski, Associate Director

Technical areas include axiomatics research, CAD/CAM, machine dynamics research, flexible materials processing, metals processing research, polymer processing research, productivity analysis research, tribology research and design manufacturing integration.

The Laboratory, organized in 1977, consists of 20 faculty members, 70 graduate students, and 12 staff members. They are concerned with study and implementation of manufacturing productivity.

Sixty percent of their funding comes from 25 industrial clients, and 40 percent from government sources (ONR, DARPA, NSF, NASA) and membership in colloquium.

Publications include a brochure and "Laboratory for Manufacturing and Productivity Annual Report", and bibliographies in eight research areas. Copies of papers are available on request.

Facilities Total: 50,000 sq. ft.

Center Number: 107

Lawrence Technological University
Lawrence Institute of Technology
21000 West Ten Mile Road
Southfield, MI 48075
313 356-0200

Organized: 1984

Host Organization
- Lawrence Institute of Technology

Wayne Brehob, Chairman
Prof. Vernon Fernandez, Assistant Professor

Technical areas include robotics, CIM, vision, materials handling, and manufacturing.

The laboratory, organized in 1984, consists of six faculty members and 12 adjunct. Their goal is to provide training in manufacturing engineering and provide support for business through continuing education and research. An undergraduate course in mechanical engineering with concentration in manufacturing is offered.

Their funding comes from tuition, industry support and contracts.

Publications include a brochure and engineering bulletin.

Facilities: Manufacturing engineering laboratory and materials handling.

Louisiana Productivity Center
P.O. Box 44172
241 East Louis Street
Lafayette, LA 70504-4172
318 231-6767

Organized: 1986

Host Organization
- University of Southern Louisiana
Sponsor(s)
- State of Louisiana

Steve Killingsworth, Director

Ken Alton, Assistant Director

Technical areas include business assistance, business management, full-scale FMS, automation, CAE, expert systems, simulation. The center will help the client acquire appropriate equipment and will train employees in the use of CAD/CAM. A particular focus is to help companies in the oil and gas industries to find other markets. In many cases, this involves assistance in finding and preparing bids for Federal Government contracts.

The center, organized in 1986, consists of 10 staff members, three graduate students, 10 ME students, and 10 industrial technology students. Their goal is to draw upon the engineering expertise at the University of Southern Louisiana, especially CAD/CAM, to improve the productivity of client industries and transfer technology to industries in the area.

Their funding is derived from State of Louisiana line item appropriations, ($1 million per year) and contracts with 18 companies.

Publications include brochures and reports.

Facilities: 15,000 sq. ft. labs

Facilities Total: 100,000 sq. ft.

Machinability Data Center
Manufacturing Technology Division
Metcut Research Associates
11240 Cornell Park Drive
Cincinnati, OH 45242-1812
513 489-6688

Organized: 1964

Host Organization
- Metcut Research Associates Incorporated

Susan Moehring, Director

Mary Campbell, Staff
Nancy Lyle, Staff
Deborah Mitchell, Staff

Technical areas include machining, tool materials, cutting fluids, surface integrity, grinding, tool life, nontraditional machining, computer aided manufacturing, machinability data systems, and process planning. The center collects, evaluates, stores, retrieves, disseminates machining information including specific and detailed data.

The center was organized in 1964. Its goal is to provide information services to increase productivity, reduce machining costs, and improve product reliability in an industry where over $125 billion is spent annually for labor and overhead alone. The organization consists of five full-time staff members and 10 consultants.

Funding is provided by private organizations.

Publications include "Machining Briefs" published periodically, and the "Machining Data Handbook". Other availabilities include computer software, seminars, and some services and publications on request.

Facilities Total: 8,000 sq. ft.

Center Number: 110

Machining Initiatives for Aerospace Subcontractors (MIAS)
One Oliver Plaza
Pittsburgh, PA 15222
412 566-3262

Organized: 1986

Host Organization
- DRAVO Automation Sciences, Inc.
Sponsor(s)
- U.S. Air Force

Dr. Petros N. Pappas, Project Manager SMIS
Mr. William Rogers, DRAVO, MIAS Project Manager

Technical areas include unattended turning center, unattended machining center, work holding, modular queueing fixtures, torque-controlled machining, tool wear and breakage sensing, activity fault logs, tool management, tool dominant programs, software and manufacturing, planning and control systems, small manufacturing improvement services (SMIS), i.e., technology assessment and diagnosis.

The center was organized in January 1986. The goal of MIAS is to increase the productivity and performance of the aerospace machining subcontractors. There are three full-time staff members plus numerous subcontractor staff members at on-site locations.

Funding is provided by the USAF MANTECH Directorate, Wright R&D Laboratories, at an approximate level of $3 million per year.

Publications include information literature.

Mantec Inc.
Suite 313
22 South George Street
York, PA 17401
717 846-8879

Organized: 1988

Host Organization
- Pennsylvania State University

George Miller, Director

Technical areas include complete advanced automated manufacturing, machine vision, quality assurance, quality cost, quality statistics, CAD, simulation, flexible manufacturing, CIM, robotics, and material handling.

The center was organized in 1988. Its goal is to find opportunities for member firms to improve productivity. This is achieved by providing information, planning, and application assistance focused to their resources. The organization consists of three full-time staff members and one clerical member.

Funding is in the amount of $1.25 million and the center is a nonprofit organization.

Descriptive brochures and videotapes are available.

Facilities Total: 32,000 sq. ft.

Center Number: 112

Manufacturing Engineering Applications Center (MEAC)
Worcester Polytechnic Institute
100 Institute Road
Worcester, MA 01609
508 831-5633

Organized: 1982

Host Organization
- Worcester Polytechnic Institute

Prof. R.D. Sisson, Director

Prof. Donald N. Zwiep, Acting Provost and V.P. for Academic Affairs

Sean Anzunoni, Staff
Robert Bean, Staff
Andy Beaupre, Staff
Paul Cotnoir, Staff
Ken Ward, Staff

The center, organized in 1982, consists of five full-time employees, five to 10 faculty members, and seven graduate students. Their goal is to share scientific manufacturing knowledge and skills with industry in the form of research and applied technology.

Their funding is derived from sustaining memberships, contracts, and grants.

Publications include a brochure and a graduate manufacturing course catalog.

Facilities: Lab space including modern manufacturing equipment, computer facilities, and robots, for example.

Facilities Total: 5,000 sq. ft.

Manufacturing Engineering Center
Virginia Polytechnic Institute & State University
IEOR Department
302 Whitemore Hall
Blacksburg, VA 24061
703 231-6656

Organized: 1970

Host Organization
- Virginia Polytechnic Institute and State University
Sponsor(s)
· State of Virginia

Dr. Robert Dryden, Director

Dr. Michael Deisenroth, Staff
Dr. Walter Fabrycky, Staff

Technical areas include human computer interaction, machine display and controls, environmental, safety, industrial ergonomics, robotics, flexible manufacturing systems, and process control.

Organized in 1970, the center's goal is to improve quality in research and education. The organization consists of a pool of 28 faculty members, a pool of 150 students, and nine full-time staff members.

Funding is provided by the state, private companies, and the Federal Government in the amount of $3.2 million annually.

Selected resumes.

Facilities Total: 24,000 sq. ft.

Manufacturing Engineering Consortium
University Avenue
University of Texas - El Paso
El Paso, TX 79968
915 747-5450

Organized: 1983

Host Organization
- University of Texas - El Paso

Dr. Juan Herrerra, Director

J.P. Hsu, Staff
Dr. Caroll Johnson, Staff
Dr. Thomas McLean, Staff
Dr. Steve Stafford, Staff

Technical areas include robotics, CAD/CAM, CIM, end of arm tooling, CNC software, AI, heat transfer, vibration, machining complex curves, manufacturing planning, machine vision, and systems machine design.

The center was organized in 1983. Its goal is to provide services to industry and expertise on problems in manufacturing. The organization consists of 24 faculty members and 120 students.

Funding is provided by industry sponsored scholarships.

Descriptive brochures are available.

Facilities: CIM 12,500 sq ft, machine shop 3,000 sq ft, computer 6,000 sq ft, expert systems 600 sq ft, and robots 400 sq ft.

Facilities Total: 45,000 sq. ft.

Manufacturing Productivity Center (MPC)
IIT Center
10 West 35th Street
Chicago, IL 60616-3799
312 567-4800

Organized: 1977

Host Organization
- IIT Research Institute
- Illinois Institute of Technology

Dr. Keith E. McKee, Director

Dr. Jack Baranson, Associate Director
Ms. Deborah L. Bruno, Typist
Dr. Maurice A. H. Howes, Associate Director
Carol J. Sessions-Robinson, Editor
Cynthia A. Spoor, Coordinator
Michal Stevens-Safar, Information Specialist

Technical areas include metalworking, robotics, sensors, quality management, net shape metal forming, computer aided design, industry analysis, infrared sensing, welding, flexible systems, productivity, technology evaluation, artificial intelligence, computer aided manufacturing, automated inspection, productivity audits, lasers for manufacturing, automation, technology forecasting, vision systems, and expert systems.

MPC, founded in 1977, emphasizes the full range of manufacturing technology and productivity. Studies valued at more than $6 million annually are conducted for 150 companies and government agencies. Most of these studies are conducted on a one-on-one basis for individual companies. The MPC interacts with a variety of organizations, such as Borg-Warner, General Electric, Lockheed, Rexnord, Sealed Power, Westinghouse, AIM-TECH, National Electrical Manufacturers Association, National Computer Graphics Association, and Society of Manufacturing Engineers.

The MPC organizes conferences and seminars including: Future Trends in Gear Manufacturing (Lafayette, Sep 1988), National Conference on Fluid Power (Chicago, Oct 1988), Second International Conference on Productivity Research (Miami, Feb 1989).

The best known of a variety of publications is the 50-page monthly, "Manufacturing Competitiveness Frontiers" available by subscription for $100 annually. Specialty publications include conference proceedings.

Facilities: Facilities include campus resources of IIT and IITRI.

Center Number: 117

Manufacturing Research Center (MRC)
Georgia Institute of Technology
Atlanta, GA 30332
404 894-2303

Organized: 1987

Host Organization
- Georgia Institute of Technology
Sponsor(s)
- Digital Equipment Corporation; IBM; Motorola; State of Georgia

Dr. Michael Thomas, Acting Director

Technical areas include electronic manufacturing, interconnection technology and manufacturing systems.

The center was organized in 1987. Its goal is to help U.S. industry to develop cooperative research programs to maintain a competitive edge in world markets. The organization consists of one professional and one clerical staff member.

Funding is provided by Motorola, IBM, and Digital Equipment Corporation in excess of $3 million, and from the State of Georgia in the amount of $15 million (new building and equipment). Additional funds from industry and agencies of the Federal Government are being sought. There are three endowed chairs.

Publications include a 200-page prospectus.

Facilities Total: 100,000 sq. ft.

Center Number: 118

Manufacturing Systems Center (planning)
Engineering Science Building 242B
University of Texas - Austin
Austin, TX 78712-1084
512 471-6984

Organized: 1988

Host Organization
- University of Texas - Austin

Willis Adcock, Director

Technical areas include electronic manufacturing, generic manufacturing, and discrete parts manufacturing.

The center was organized in 1988. Its goal is to provide a focal point for the University and manufacturing interests. The organization consists of two full-time staff members, 50 faculty members and 50 graduate students.

Support includes industry contributions of hardware and software, and university salaries and space.

Publications include prospectus; brochures are forthcoming.

Facilities: Manufacturing systems $20 million building.

Facilities Total: 10,000 sq. ft.

Manufacturing Systems Engineering Program
Department of Industry and Systems
University of Florida
Gainesville, FL 32611
904 392-1464

Organized: 1984

Host Organization
- University of Florida
Sponsor(s)
- State of Florida

Jack Elzinga, Director

Keith Doty, Staff
Sereshteh Ebrahimi, Staff
Lewis Martin-Vega, Staff
Stanley Su, Staff
Jiri Tlusty, Staff
David Zimmerman, Staff

Technical areas include computer-aided design/graphics, computer aided manufacturing/automation and robotics, production management, and manufacturing processes. In-depth expertise exists in the areas of hardware and software aspects of CAD/CAM, robotics, metal cutting computerized and unmanned machining systems, man-machine interaction, production management, quality control, distributed database systems, and information processing.

The goal of the center, organized in 1984, is to provide industry with graduate degree engineers in manufacturing systems engineering and to provide continuing education opportunities for the nation's manufacturing industry. The organization includes 50 faculty members in six departments and 30 graduate students.

Sustaining funding comes from the State of Florida with $42,000 per year from industry, gifts and stipends and an additional $10,000 in corporate donations.

Publications include promotional brochures and curriculum guides.

Facilities: 13 laboratories including CAE, computer graphics, CIM, robotics, ceramics, metals-polymers, semiconductor materials and others.

Facilities Total: 15,000 sq. ft.

Center Number: 120

Manufacturing Systems Engineering Program & Product Quality Res. Ctr.
School of Engineering
University of Michigan - Dearborn
Dearborn, MI 48128-1491
313 593-5119

Host Organization
- University of Michigan - Dearborn, School of Engineering
Sponsor(s)
- National Science Foundation

W.M. Spurgeon, Director Manufacturing Systems Engineering Program

The program includes both instructional and research activities. Instructional activities are as follows: a BS program in manufacturing systems engineering, manufacturing concentration; an MS program in manufacturing systems engineering; continuing education short courses - for graduate engineers, offered on campus and at company sites; faculty enhancement program - this program, sponsored by NSF, increases the knowledge and teaching skills of college level faculty;conferences in manufacturing.

Research activities are as follows: information handling systems for manufacturing; product assembly; exploratory research for new unit operation, foundry productivity; Product Quality Research Center - this center was approved by the Regents of the University of Michigan in 1986. It is supported by the state's Research Excellence and Economic Development Fund and by companies. It's objective is new knowledge usable to increase product quality, where a "product" can be hardware, software or a service.

Technical papers and research reports.

Facilities: Laboratory building; Prime computer with MEDUSA and PDGS software; many microcomputers; CNC machine tools; and an experimental foundry.

Facilities Total: 10,000 sq. ft.

Center Number: 121

Manufacturing Technology Center (MTC)
University of Illinois at Chicago
Chicago, IL 60680
312 996-4354

Organized: 1989

Host Organization
- University of Illinois, Chicago Circle Campus
Sponsor(s)
- Motorola; State of Illinois

Dr. K.K. Kim, Director

John Cesarone, Assistant Professor
D.W. Wu, Assistant Professor

Technical areas include CIM, computer controlled machining, metal cutting tools, and robot collision avoidance.

The center will be established in 1989. The goal is to provide access to advanced manufacturing research for Chicago area companies. Staff members include 10 faculty and 20 graduate students.

Funding will include sustaining funds from the State of Illinois and a startup donation of $1 million from Motorola.

Facilities: Laboratory space with a new building containing four new laboratories to be available in 1990.

Facilities Total: 15,000 sq. ft.

Center Number: 122

Manufacturing Technology Information Analysis Center (MTIAC)
Operations Office
IIT Research Institute
10 West 35th Street
Chicago, IL 60616-3799
312 567-4730

Organized: 1984

Host Organization
- Cresap, A Towers Perrin Company
- IIT Research Institute

Sponsor(s)
- Defense Logistics Agency

Robert A. Walk, Director

Michal Stevens-Safar, Information Specialist

Becky Gaebe, Staff
Marge Hernandez, Staff

Technical subjects include metals, nonmetals, inspection and test, electronics, munitions, and computer aided design/computer aided manufacturing.

MTIAC was established on June 4, 1984. The goals of the Manufacturing Technology Information Analysis Center are to promote the exchange of manufacturing technology information and support DoD Manufacturing Technology Advisory Group needs. This is accomplished by collecting, processing, and disseminating technology information. Products include abstracts, indexes, technical inquiries, bibliographic services, state of the art reports, critical reviews, special studies and tasks, and technology assessments. Total staff includes five full and part-time

Base costs are covered by the U.S. Department of Defense, while direct costs incurred in preparation of materials and responses are paid by service charges (fees for services).

Publications include the Current Awareness Bulletin (published quarterly), state of the art reviews, "Directory of Manufacturing Research Centers" and technical reports.

Manufacturing Technology Laboratory
College of DuPage
Glen Ellyn, IL 60137
312 858-2800

Organized: 1986

Host Organization
- College of DuPage

Mark Meyer, Coordinator of Manufacturing Technology
Thomas Roesing, Associate Dean

Technical areas include robotics, CIM, computer assisted manufacturing, metrology, computer systems, tribology.

The laboratory was organized in 1986. The goal of the laboratory is to bring knowledge and skills to applications in area industry through training and support in advanced automation technology transfer. Staff includes 20 faculty and 20 professional staff members (part-time).

The funding for startup was institutionally supported with sustaining funds of $15,000 per year and grants of $20,000 per year.

Publications include a brochure and a curriculum catalog.

Facilities: Laboratory.

Facilities Total: 7,500 sq. ft.

Center Number: 124

Manufacturing Technology Laboratory
Mohler Lab 200
Lehigh University
Bethlehem, PA 18015
215 758-4030

Organized: 1986

Host Organization
- Lehigh University

Dr. Mikell P. Groover, Director

Technical areas include manufacturing processes, emphasis on machining, standalone automation, material handling and storage, metrology, and systems integration.

The laboratory, organized in 1986, consists of three full-time employees, 10 faculty members, and 10 graduate students. The goal is to provide a modern laboratory facility for education and research in manufacturing.

Publications consist of a three-page statement and brochure.

Facilities Total: 3,500 sq. ft.

Center Number: 125

Material Handling Research Center (MHRC)
Georgia Institute of Technology
Atlanta, GA 30332-0205
404 894-2448

Organized: 1982

Host Organization
- Georgia Institute of Technology

Dr. Ira W. Pence, Jr., Director

Dale Atkins, Staff
Dr. Ronald Bohlander, Staff
Dr. Stephen Dickerson, Staff
Dr. Marc Goetschalckx, Staff
Dr. Leon F. McGinnis, Staff
Dr. Gunter Sharp, Staff

Technical areas include flexible automation systems, intelligent systems, manufacturing systems, warehousing, and logistics as applied solely to material handling.

The center was organized in 1982. Its goal is to increase manufacturing productivity and extend the state of the art in material handling through education. The organization consists of 12 faculty members and 24 graduate students.

Sustaining funding comes from Georgia Institute of Technology in the amount of $500,000. Additional funding comes from member company dues in the amount of $1 million, and $100,000 in contracts.

Publications include brochures, list of applications, semiannual reports to members, technology reports on each project, videotapes, and proprietary software.

Facilities: Facilities include the 4,000 sq ft material handling research laboratory, the flexible automation laboratory, and an AGVs laboratory.

Facilities Total: 10,000 sq. ft.

Mechanical Technology (Manufacturing)
Industrial Related Technology/Data Process Div.
Black Hawk College - Quad Cities Campus
6600 34th Avenue
Moline, IL 61265
309 796-1311

Organized: 1981

Host Organization
- Black Hawk College - Quad Cities Campus
Sponsor(s)
- State of Illinois

Dr. Richard Henry, Director

Technical areas include robotics/flexible automation, CNC, quality control statistics, machine tool operations/production, manufacturing CAD/CAM.

The MT laboratory was organized in 1981. The goal is to provide students with manufacturing technology skills required for local industry. Staff includes 12 faculty plus assisting undergraduate students.

Sustaining funding is obtained from the State of Illinois with special projects funded by local government and industry, including Deere and Company.

Publications include fact sheets, flyers, and a curriculum catalog.

Center Number: 127

Metals and Ceramics Information Center (MCIC)
505 King Avenue
Columbus, OH 43201-2693
614 424-4425

Organized: 1955

Host Organization
- Battelle - Columbus Division
Sponsor(s)
- Defense Logistics Agency

Harold Mindlin, Director

Ms. Patricia Church, Administrative Aide
Helen Pestel, Staff

Special interest areas handled by MCIC include metals - titanium, aluminum, magnesium, beryllium, refractory metals, high strength steels, super alloys; ceramics - borides, carbides, carbon graphite, nitrides, oxides, sulfides, silicides, glass, glass ceramics, ceramic composites; coverage - coatings, corrosion and environmental protection, mechanical and physical properties, materials applications, test methods, sources suppliers; processes - basic materials production, fabrication, joining, powder processes, surface treatment, Q.C. and inspection.

The Metals and Ceramics Information Center was established in 1955. Their goal is to provide specialized information on advanced materials and ceramics to DoD suppliers and contractors and to other users. MCIC collects, reorganizes and makes available information from data bases and sources otherwise not conveniently accessible. Information is provided in forms ranging from abstracts and indexes to complete reports or special studies. Total staff includes nine full-time and part-time members.

Base support is provided by the U.S. Department of Defense, with fee-for-service charges to offset the direct costs of information preparation.

Publications include a monthly newsletter, state of the art reviews and handbooks.

Center Number: 128

Milwaukee Engineering Consortium
Marquette University
1515 West Wisconsin Avenue
Milwaukee, WI 53233
414 224-6720

Host Organization
- Marquette University

Dr. Robert L. Reid, Dean of Engineering

This is a consortium of industrial clients (six to seven) at $20,000 annually who fund a graduate student to conduct directed research at Milwaukee School of Engineering (MSOE), University of Wisconsin - Milwaukee (UW-MIL), or Marquette University.

Minnesota Advanced Manufacturing Technology Centers Inc. (MAMTC)
International Centre II
920 Second Avenue South
Suite 1250
Minneapolis, MN 55402
612 338-6666

Organized: 1988

Host Organization
- Greater Minnesota Corporation
Sponsor(s)
- State of Minnesota

Carolynn Hiatt, Chair, President Prosys Technology Inc.

Donald R. Riley, Vice Chair, Associate Director U of M Prod. Ctr.

Technical programs include technology assessment and assistance teams, pilot automated manufacturing and proof-of-concept, applied research and development, technology commercialization, establishment and support of satellite centers, hands on training in both the technologies and the practice of advanced manufacturing, and the development and management of partnerships involving the private sector, government and higher education.

The state-funded center was organized as a nonprofit corporation in July 1988. Its goal is to establish manufacturing centers to promote acceptance and application of advanced manufacturing technology in Minnesota companies.

The State of Minnesota funding was an initial $500,000 plus $2 million per year for five years. The yearly budget is $5 to $8 million.

Prospectus in preparation.

Facilities: Initial 10,000 sq ft. MAMTC also leverages the University of Minnesota Productivity Center's facilities for applied research and education.

Facilities Total: 30,000 sq. ft. planned

Center Number: 130

National Center for Excellence in Metalworking Technology (NCEMT)
1450 Scalp Avenue
Johnstown, PA 15904
814 266-2874

Host Organization
- Metalworking Technology Incorporated (nonprofit)
Sponsor(s)
- U.S. Navy

Mr. Daniel R. DeVos, President

Dr. Howard Kuhn, Technical Vice President
Mr. John B. Pursley, Vice President Finance and Administration

Technical areas include near-net shape processes, surface treatment and structure control, nontraditional cutting and joining processes, and technology of advanced materials.

The goal of NCEMT is to identify suitable technological solutions to metalworking manufacturing problems, and to transfer those solutions to the manufacturing floor. This is achieved through technology transfer, on-line knowledge bases, seminars, hands-on workshops, process handbooks, process development and equipment demonstrations, material testing, physical model simulation, finite element modeling, process demonstration, control system implementation, equipment evaluation and demonstration, contract research, prototype and expert system development.

A brochure is available.

Facilities: State of the art CAD/CAM/CIM - finite element modeling (FEM) capability, and a fully equipped testing laboratory.

Facilities Total: 11,000 sq. ft.

National Center for Manufacturing Science
900 Victors Way
Ann Arbor, MI 48108
313 995-0300

Organized: 1985

Host Organization
- University of Michigan
Sponsor(s)
- U.S. Air Force

Edward Miller, Director

William J. Kruckeberg, Membership

Tom Mullen, VP, Public Affairs and Marketing

This is a consortium of member companies providing hard goods and services for the U.S. based manufacturing industry. The agenda is developed and driven by member companies keying on technology transfer functions. The center is selective in contractors, and provides strictly technical direction with administration of the agenda through the best source.

The center, organized in 1985, has 20 full-time employees. Their goal is to bring the United States back to the helm of manufacturing superiority, with a target of keeping administrative costs at 10 percent of research funds.

The revenues come from the 82 member companies. Ten of these are Fortune 500 ranked. Dues are based on revenue and range from a minimum of $2,000 to $250,000.

Brochures are available.

Center Number: 132

National Coalition of Advanced Technology Centers (NCATC)
601-C Lake Air Drive
Waco, TX 76710
817 772-8756

Daniel M. Hull, Director

Elizabeth B. Smith, Staff

The Coalition is composed of over twenty member institutions that offer a wide range of customized services for business and industry. Services include technology transfer, training and retraining, beta testing, new product and process demonstrations, and consulting.

Training and retraining programs vary according to the institution and local needs. Offerings by member institutions include quality control, computer numerical control, robotics, computer aided design, laser/electro-optics, fiber optics, computer integrated manufacturing, electronics, telecommunications, hazardous materials handling, and office automation. NCATC is an affiliate of the American Association of Community and Junior Colleges.

Descriptive brochures are available.

National Institute for Flexible Manufacturing (NIFM)
P.O. Box 455
Meadville, PA 16335
814 333-2415

Organized: 1987

Host Organization
- Meadville Area Chamber of Commerce

Sponsor(s)
- National Tooling and Machining Association; Pennsylvania Industrial Research Center

Frank Coppola, Chief Executive Officer

Gene Allen, Chief Operating Officer
Harold Corner, President, Board of Trustees
Martha Miller, Associate Director of Development and Planning
Raymond Schaefer, Chairman of the Board

Technical areas include metal machining, CNC programming, cells of CIM, electronics, plastics, polymer sciences, and ceramics.

The center, organized in October 1987, has five full-time staff members. The goal is to re-train existing workers in the new technologies, provide services to industries without capabilities for retraining, and provide support to take back to the factory.

This is a nonprofit educational institute whose source of income is the Pennsylvania Industrial Research Center with the National Tooling and Machining Association, supplying in-kind services.

Publications consist of basic publications and brochures.

Facilities: 10,000 sq ft classrooms, and 10,000 sq ft production space.

Facilities Total: 20,000 sq. ft.

NIST Great Lakes Manufacturing Technology Center
2415 Woodland Avenue
Cleveland, OH 44115
216 531-8211

Organized: 1989

Host Organization
- Cleveland Advanced Manufacturing Program
Sponsor(s)
- National Institute of Standards and Technology (NIST)

Ray Depuy, Assistant Director
Dr. George Sutherland, Director

Technology demonstration, training and problem solving in general manufacturig with an emphasis upon polymer processing is planned.

This is one of three awards made by the National Institute of Standards and Technology (NIST) in 1989. The goal of the Manufacturing Technology Center program is to speed the transfer of advanced manufacturing technologies to U.S. industry. Total staff is anticipated to reach thirty.

Total funding of $6 million per year with half supplied by NIST on a dollar-for-dollar matching basis is planned.

Publications include a prospectus, brochures, and a videotape. Also planned are promotional materials.

Center Number: 135

Nondestructive Testing Information Analysis Center (NTIAC)
Southwest Research Institute
6220 Culebra Road
P.O. Drawer 28510
San Antonio, TX 78284
512 522-2737

Organized: 1974

Host Organization
- Southwest Research Institute
Sponsor(s)
- Defense Logistics Agency

Frank Iddings, Director

Maureen Ahr, Administrative Assistant
Gladys Ashley, Data Base
Betty Barnes, Information Analyst

Areas of content specialization include the techniques and processes for nondestructive evaluation, e.g., radiography, acoustics, magnetic methods and holography. The center is also concerned with economic considerations, industry trends, and impact upon production, maintenance, safety, monitoring, and life assurance.

The Southwest Research Institute began operation of NTIAC in 1974. The goal of the Nondestructive Testing Information Analysis Center is to provide professional vendors and information support for Department of Defense related agencies, vendors and contractors. This is achieved by preparing a range of information packages which include abstracts, state of the art summaries, critical evaluations, specialized reports and special studies. Total staff numbers four, including full and part-time members.

The Department of Defense supplies base level funding with fee-for-service charges imposed to cover the direct costs of information delivery.

Publications include bibliographies, state of the art reports, newsletters and a users guide available to interested parties.

Northeast Manufacturing Technology Center (NMTC)
Center for Industrial Innovation (CII)
Room 9005
Rensselaer Polytechnic Institute
Troy, NY 12180-3590
518 276-6724

Organized: 1989

Host Organization
- Rensselaer Polytechnic Institute
Sponsor(s)
- National Institute of Standards and Technology (NIST)

Dr. Leo Hanifin, Director

Ginny Willigan, Administrative Assistant

Technical areas include applying advanced manufacturing technologies to material removal, and assembly and inspection of mechanical components for the automotive, consumer, and electronic industries.

The National Institute of Standards and Technology (NIST) established funding agreements for three regional manufacturing technology centers in 1989. The goal of the Northeast Manufacturing Technology Center is to speed transfer of advanced technologies to U.S. industry, especially small and medium-sized companies.

Funding is anticipated to be $1.5 million per year and will be matching dollar for dollar funds, with at least half of non-NIST funds to be cash.

Publications include a prospectus, brochures, and videotapes are planned.

Optoelectronics Center
School of Electrical Engineering
Purdue University
West Lafayette, IN 47907
317 494-3514

Organized: 1986

Host Organization
- Purdue University
Sponsor(s)
- State Corporation for Science and Technology

Prof. J.A. Cooper Jr., Director

Richard McDaniel, Staff
R.J. Schwartz, Department Head

Technical areas include optoelectronics, fiber optic sensors, high-speed semiconductors, compound semiconductor optical devices, active matrix display devices, complementary ambipolar (amorphous) IC logic.

The center was organized in 1986. The goal is optoelectronic research for companies within the State of Indiana. Staff consists of seven faculty members and ten graduate assistants.

Funding is supplied by the State Corporation for Science and Technology.

They have no brochures and no literature available at the present time.

Facilities Total: 10,000 sq. ft.

Center Number: 138

Pacific International Center for High Technology Research (PICHTR)
2875 South King Street, 1st Floor
Honolulu, HI 92826
808 948-7850

Organized: 1983

Sponsor(s)
- State of Hawaii; U.S. Department of Energy

Ronald J. Hays, President and CEO

Technical areas include robotics, computer vision, expert systems, natural language processing, capability for VTI, computer hardware plus software for VLSI, submersibles, multiproduct open cycle ocean thermal energy conversion, seabed mining, hydrogen enery conversion, wind powered hydroelectric systems, optical laser disk correction system, computer assisted instruction applications tutor and genetic manipulation of algae.

PICHTR was organized in 1983 by the State of Hawaii Legislature and in 1985 PICHTR became a nonprofit research and educational organization. Its goal is to become a research institute with an international focus and to bridge the gap between academic research endeavors and society's use of the results of such research. The organization consists of 40 full-time staff members and 30 faculty members.

Funding comes from various sources such as the State of Hawaii, U.S. Department of Energy, private industry and foreign governments. Present total funding is approximately $5 million.

Publications include an annual report and newsletters.

Facilities: Sometime in 1990 PICHTR will move to new facilities, a 11,000 sq ft site with laboratories taking more than 3,000 sq ft of the new location.

Facilities Total: 11,000 sq. ft.

Center Number: 139

Pima Community College
West Campus
2202 West Anklam Road
Tucson, AZ 85709
602 884-6920

Organized: 1989

Host Organization
- Pima Community College

Dr. Kenneth B. McCollester, Staff

Technical areas will include CAD/CAM, CNC machine tooling.

This organization is planning to be in operation in 1989-1990. The goal of the projected center is the training of manufacturing technologies for Arizona area industry and technology transfer through cooperation in solving application problems.

Startup and sustaining funding are in planning stages.

At the time of publication a prospectus is in preparation. No brochures are presently available.

Facilities: Facilities will include presently existing laboratories and classrooms.

Center Number: 140

Production Technology Center
Department of Industrial Technology
University of North Dakota - Grand Forks
P.O. Box 8057, University Station
Grand Forks, ND 58202
701 777-2249

Organized: 1989

Host Organization
- University of North Dakota - Grand Forks
Sponsor(s)
- State of North Dakota

Myron Bender, Chairman Industrial Technology

Technical areas include material science, robotics, electronics, logic and instrumentation, CNC machining, foundry, CAD, photography, graphic communications, quality assurance, computer applications, and computer assisted publishing.

The Industrial Technology Department has existed since 1970. The center is planned for 1989 to include six faculty members and three part-time employees. The goal is training and education in manufacturing technology for industry.

The funding is derived from State of North Dakota allocations and grants, with supplemental industrial cost sharing.

Publications consist of a catalog and fact sheet.

Facilities Total: 24,000 sq. ft.

Center Number: 141

Productivity Center
Department of Mechanical Engineering
University of Minnesota
111 Church Street, S.E.
Minneapolis, MN 55455
612 625-6023

Organized: 1982

Host Organization
- Institute of Technology, University of Minnesota
Sponsor(s)
- State of Minnesota

Dr. S. Ramalingam, Director

Dr. Donald R. Riley, Associate Director

Technical areas include computer-aided design, software engineering for computer-aided engineering, computer-aided manufacture, sensors, robotics, intelligent machines, mechatronics, design automation, man-machine methods, and expert systems for automation of design and manufacturing of mechanical and electromechanical systems.

The center, organized in 1982, consists of 18 full-time faculty, 110 graduate students, two visiting scholars, one postdoctoral fellow, two technicians and one staff member. The mission of the Productivity Center, apart from education and research, is to facilitate the introduction of new or improved advanced technology-based solutions for design and manufacturing automation in industry.

The center receives approximately $350,000 annually from the State of Minnesota. In addition, the center is the sponsor for the CIM (Computer Integrated Manufacturing) Consortium, a joint venture between industry and the university, which has a yearly budget of $100,000 at this time. The center's total budget, including federal and private industry research grants and contracts, is nearly $2 million per year.

Publications consist of a biennial report and newsletter, plus publications generated by workshops and meetings held by the Center. Affiliated faculty also publish in journals and conference proceedings.

Facilities: CAD/CAE/graphics laboratory, intelligent machine/materials processing laboratory, and robotics laboratory.

Facilities Total: 10,000 sq. ft.

Center Number: 142

Program for Automation in Manufacturing (PAM)
Department of Mechanical Engineering
Texas A&M University
College Station, TX 77843-3123
409 845-4763

Organized: 1987

Host Organization
- Texas A&M University

Dr. Morris Driels, Director

Lee Blank, Director for Manufacturing Systems

Technical areas include knowledge based systems, material processing, robotics, sensor systems, assembly automation, systems integration.

The center was organized in 1987. Its goal is to conduct basic research in the manufacturing sciences and to transfer technology to the sponsoring clients. The organization has access to 500 faculty members and 1000 graduate students.

Funding is via a consortium membership with fees of $30,000 annually. There are presently seven members with two more anticipated.

Publications include brochures and reports for members only.

Facilities Total: 4,500 sq. ft.

Center Number: 143

Program in Manufacturing Systems Engineering (PMSE)
Florida Atlantic University
Boca Raton, FL 33431
407 393-3428

Organized: 1988

Host Organization
- Florida Atlantic University
Sponsor(s)
- State of Florida

Dr. Jose Villanueva, Chairman

Dr. Kader Mazouz, Coordinator, Manufacturing Systems Engineering

Dr. Ching Ping Han, Staff
Dr. W. Huang, Staff
Dr. Oren Masory, Staff
Dr. G. Salivar, Staff
Dr. T.L. Wong, Staff

Technical areas include programmable automation, DNC, CNC, CIM, automated assembly system, flexible assembly systems, expert systems, robotics, material flow systems, production management, simulation, inspection and quality control.

The center was organized in 1988. Its goal is to support local industry in advanced automation of electronic systems assembly. The organization includes 13 faculty members and 15 graduate student assistants.

Their funding is sustained by the State of Florida up to $500,000, and also comes from contracts and grants.

Publications include general brochures and a curriculum guide.

Facilities: Existing and planned facilities include laboratories in manufacturing process, simulation, automation, CAD, FMS and robotics.

Center Number: 144

Regional High Technology Center
Haywood Community College
10 Industrial Park Drive
Waynesville, NC 28786
704 452-1411

Organized: 1986

Host Organization
- Haywood Community College
Sponsor(s)
- State of North Carolina

Sam L. Wiggins, Director

Don Barnett, Chairman - Engineering Technology Department
Bob Poore, Western Regional Training Coordinator

Technical areas include training applications in advanced technology, CAD/CAM training, flexible automated manufacturing system (CIM,FMS), manufacturing and engineering technology degree program, automated manufacturing training systems, in-plant data bases for industrial systems, automated manufacturing control systems, and industry education partnerships.

The center was organized in 1986. Its goal is to bring advanced technology training and skills to new and expanding industries in the local area. The organization consists of 11 full-time staff members, faculty (industrial, and co-op graduate students on loan from Western Carolina University).

Sustaining sponsorship comes from the State of North Carolina in the amount of $500,000. A $4 million plant is provided through federal, local and state funding and industrial partnership. Contractual projects are run through industrial/education partnerships.

Brochures are available.

Facilities Total: 25,000 sq. ft.

Research Group
Mechanical Engineering Department
University of Texas - Austin
Austin, TX 78712
512 471-3039

Organized: 1985

Host Organization
- University of Texas - Austin

Dr. Delbert Tesar, Director

Dr. Robert Freeman, Assistant Professor
Dr. S. Tosunoglu, Program Manager

Technical areas include robotics design and operations for space applications, e.g., battlefield operations, microsurgery, nuclear reactor maintenance; software development, man-machine interface development, and high speed computation.

The center was organized in 1985. Its goal is to develop fifth generation robotic technology for defense and manufacturing applications. The organization consists of 10 faculty members and 35 graduate students.

Funding includes a variety of projects: $0.57 million - DoE nuclear maintenance; $150,000 - light machining with robots; $75,000 - space operations; and $45,000 - Cray assisted robot design, for a total of $900,000 yearly.

Publications include brochures, prospectus, research projects, six to ten papers each year, and five reports per year.

Facilities: 32,000 sq ft for manufacturing engineering in a new building available in August 1990, $1 million in equipment.

Facilities Total: 32,000 sq. ft.

Center Number: 146

Robert Perkins Center
College of Engineering
North Dakota State University
Fargo, ND 58105
701 237-7525

Organized: 1985

Host Organization
- North Dakota State University

Joseph Stanislav, Director

Dr. Kenneth Abling, Staff

Technical areas include advanced manufacturing automation, health care modeling, mapping for utilities and municipalities, and power transmission distribution networks.

The center was organized in 1985. Its goal is to interact with industry to sustain funds and build hardware and software for university laboratory environments. The organization consists of five full-time faculty members and 25 graduate students.

The center is completely funded by industry in the amount of $150 to $200 thousand.

Brochures are available.

Facilities: Engineering Computer Center with a CIBER 180.

Facilities Total: 20,000 sq. ft.

Robotics and Automation Department
Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78284
512 522-3678

Organized: 1982

Host Organization
- Southwest Research Institute

Robert Hambright, Director

Ernest Franke, Manager - Machine Perception

Technical areas include robotics, machine perception, machine vision, adaptive process control, and CAD/CAM support.

The center was organized in 1982. Its goal is to conduct research and development services in advanced technical areas for government and industry. The organization consists of 27 full-time staff members plus consultants from the University of Austin and Texas A&M.

Funding is provided by industry and government.

List of publications, project briefs, brochures and annual reports are available.

Facilities: High Bay equipment areas.

Facilities Total: 7,500 sq. ft.

Center Number: 149

Robotics Institute
Carnegie-Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213-3890
412 268-3818

Organized: 1979

Host Organization
- Carnegie-Mellon University

Raj Reddy, Director

Frank Pittman, Associate Director

Technical areas include computer vision, systems architecture, CAD, CIM, manufacturing management, parallel processing, robotic research, robotic applications of computer science, artificial intelligence, and mathematical modeling.

The Institute, organized in 1979, consists of 65 faculty members, 120 graduatee students, 10 visiting scientists, and 65 support staff. Their goal is to perform basic research on manipulation planning, and control with transfer of the technology by application and knowledge to factory floor, home, and in the field.

Publications consist of numerous articles, conferences, reports, theses, and an annual report.

Center Number: 150

Robotics Research Center
Kirk Building
University of Rhode Island
Kingston, RI 02881
401 792-2514

Organized: 1971

Host Organization
- University of Rhode Island
Sponsor(s)
- National Science Foundation; State of Rhode Island

Dr. William Palm, Director

Technical areas include CAD of mechanisms, parts transfer, machine tending, assembly, system integration, versatile grippers, tactile sensors, sensor integration, machine intelligence, autonomous vehicles, and robotics in health care.

The center was organized in 1971. The center goal is to strengthen their position in problem-driven research in the integration of robotics and advanced sensor-based systems in industry; to enhance transfer of technology from laboratory through industry/university cooperation; and to provide education in robotics for students and industry. The organization consists of five faculty members, one full-time staff member, and 30 students.

Funding is provided by industry contracts in the amount of $700,000. Additional funding is provided by NSF, the state government and matching funds.

Descriptive brochures are available.

Facilities Total: 6,000 sq. ft.

Center Number: 151

Rock Valley College Technology Center
Rock Valley College
3301 North Mulford Road
Rockford, IL 61111
815 654-5500

Organized: 1987

Host Organization
- Rock Valley College

Rolland O. Westra, Director

John Banaszak, Director Technology Division
Steve Carter, Director Management Institute
Dolores Ford, Program Director Technology Center
Lowell Hoisington, Director Computer Services
Bob Link, Director Manufacturing Technology
Charles Nelson, Director Computer Science Division

Technical areas include CIM, CNC programming, process planning, CAD, robotics, fluid power, quality assurance, quality control, statistical process control, metrology, and nondestructive testing.

The goal of the center is to provide education, training and resources to local industry. Technology transfer will be aided by providing businesses with an opportunity to see advanced technology in the full scale CIM cell which will be operational in late 1989. Small manufacturers are encouraged to upgrade and modernize their equipment and processes through the Technology Assessment Program, which provides low cost consulting and assistance on modern manufacturing. The technology center houses the mainframe computer which services the college.

An $8.7 million local tax referendum was passed in 1984 and the center was opened in 1987.

Publications include brochures and curriculum catalog.

Facilities: New building with a 4,000 sq ft robotics laboratory, custom test equipment, CAD facilities and a CIM cell that will be operational in 1989.

Facilities Total: 72,000 sq. ft.

Center Number: 152

Science-Math Cluster
Montgomery College
Germantown Campus
Germantown, MD 20874
301 353-7700

Organized: 1985

Host Organization
- Montgomery College
Sponsor(s)
- State of Maryland

Dr. Robert W. Menefee, Dean

Dr. Charles Kung, Staff
Dr. Vince McManaman, Staff
Dr. Ed Sereno, Staff
Prof. Ellen Terry, Staff

Technical areas include CAD, electromechanical technologies, telecommunications technology, systems engineering, configuration management, robotics, and NC.

The center, organized in 1985, is pursuing the goal to provide preservice and continuing education for technologists and support for local industry. The organization consists of four faculty members and 200 undergraduate students.

Funding comes from the State of Maryland, county and through student tuition.

General brochures are available.

Facilities Total: 3,000 sq. ft.

Center Number: 153

Scientific Industrial Development Corporation (SID Corp.)
P.O. Box 22529
132 Bridlewood Drive
Brandon, MS 39042
601 992-9025

Organized: 1988

Host Organization
- Institute for Technology Development

Richard Ambrosino, President

Matthew Brown, Vice President Engineering

Technical areas include process control, process test systems, laboratory test systems, robotics and automated CAD, manufacturing control, services and troubleshooting systems.

The center, organized in 1988, is pursuing the goal to improve the level of technological sophistication in the State of Mississippi. The organization consists of five full-time members, and 25 to 30 faculty members.

The center is supported by private funding.

Publications include fact sheets and brochures.

Facilities: New building with 5,000 sq ft, and laboratory with 1,000 sq ft

Facilities Total: 6,000 sq. ft.

South Carolina Technology Cooperative (SCTC)
Swearingen Engineering Center
University of South Carolina
Room A328
Columbia, SC 29208
803 777-4178

Organized: 1989

Host Organization
- University of South Carolina
Sponsor(s)
- National Institute of Standards and Technology (NIST)

Dr. William Ranson, Director

Dr. Ted Gasper, Staff
Don Jenkins, Staff

Technical areas include accelerated technology transfer of the automated manufacturing research facility work cell concept which includes machine tools, CAD design, CAM down links, robot servers and error correctors. The focus will be upon the fabricated metals industry in South Carolina.

The goal of the South Carolina Technology Cooperative is to transfer new manufacturing technology to small and medium-sized metal fabricating companies. This goal will be achieved by: informing and educating companies about advanced technology, demonstrating this technology, assisting in evaluating technology needs, supporting work force training, and communicating the benefits of this technology transfer to a relevant national audience. Staffing is being arranged and will include access to staffs from several universities.

Initial funding for one year with a total of five years is anticipated. NIST funding will be matched on a dollar for dollar basis, with at least half of non-NIST contributions to be in cash.

This is one of the three awards made by the National Institute of Standards and Technology (NIST) in 1989.

Publications include a prospectus, brochures, and a videotape is planned.

Southeastern Institute for Advanced Technologies
Greenville Technical College
P.O. Box 5616
Greenville, SC 29606
803 250-8000

Organized: 1988

Host Organization
- Greenville Technical College

Norman Cooke, P.E., Director

Gene Yedinak, Dean of Engineering Technology

Technical areas include all phases of engineering technology and the integration of computers into design, drafting, engineering, machine tools, office automation, telecommunications, robotics, manufacturing systems, artificial intelligence/expert systems, total quality control, and MRP II. Just in time (JIT), local area networking, geometric dimensioning and tolerancing, statistical process control, value engineering/analysis, programmable logic controllers, and new and emerging technologies are all part of the programs sponsored by the Institute.

The Institute was organized in 1988 and is dedicated to providing business and industry with courses, workshops, seminars, and other programs to meet present and future challenges in this rapidly changing technological world. The organization consists of a pool of 30 faculty members and one full-time staff member.

Funding is provided by local, state, industry and in-kind hardware and software.

Facilities Total: 15,000 sq. ft.

Center Number: 156

Southwest Center for Manufacturing Technology (SIMTC)
University of New Mexico
Albuquerque, NM 87131
505 277-5538

Organized: 1988

Host Organization
- University of New Mexico

Affiliate Organization
- Arizona State University
- BDM Corporation
- Colorado State
- Los Alamos National Laboratory
- New Mexico State
- Sandia National Laboratories
- University of Colorado
- University of New Mexico

Prof. Mo Jamshidi, Staff

Technical areas include expertise of consortium members.

The center, organized in 1988, has a staff comprised of the manufacturing technology faculty of seven organizations. The center is a consortium of universities, federal laboratories and industry with the joint goal of transferring advanced manufacturing technology to small and medium-sized industries.

Center Number: 157

SPOCAD
East 502 Boone Avenue
Spokane, WA 99258
509 484-6812

Organized: 1983

Host Organization
- Gonzaga University

Wayne Clinger, Staff
Horde Mann, Staff

Technical areas include a training consortium for industry and business, with assistance in CAD/CAM startup, technical education, in-plant training programs, selection of hardware and software, digitizing, and plotting.

The center was organized in 1983. Its goal is to provide CAD training for industry with major on-site support for special advanced automation programs. The organization consists of five full-time staff members, 20 faculty members, and 15 graduate students.

Funding is provided by manufacturing industries and facilities with in-kind hardware and software, and facilities and salaries provided by Gonzaga University and the Community College of Spokane.

Publications include material packages (education or industry/business).

Facilities: Two training rooms 1,000 sq ft and 1,500 sq ft, a work area 500 sq ft, and a conference room 3,000 sq. ft.

Facilities Total: 6,000 sq. ft.

Center Number: 158

Steel Resource Center
Northwestern University
Evanston, IL 60208
312 491-3348

Organized: 1986

Host Organization
- Northwestern University
Sponsor(s)
- American Iron and Steel Institute

Morris Fine, Director, Metallurgical Eng.

Matthew Tuite, Management
William Wilson, Manufacturing

This is an interdisciplinary center among metallurgy, manufacturing, and management. Technical areas include zinc coatings on steel, customer/supplier relations, expert systems, sheet metal forming, strand cast bars, hard carbon coatings, fatigue properties of high strength alloys, and manufacturing strategy.

The center was organized in 1986. The goal is to undertake research aimed at improving the competitive position of the domestic steel industry. Staff includes 15 faculty members and 12 graduate students.

Funding comes from the American Iron and Steel Institute.

Publications include regular six month reports and scholarly papers.

Facilities: Laboratories of the Northwestern University Technological Institute and Kellogg Graduate School of Management are used.

Center Number: 159

Technology Center
University of Scranton
Scranton, PA 18510-2192
717 961-4050

Organized: 1988

Host Organization
- University of Scranton
Sponsor(s)
- Department of Defense

Jerome P. DeSanto, Executive Director

Laurence F. Coar, Marketing
Francis L. Lynott, Project Management
Harry W. Mumford, P.E., Outreach
Arthur R. Spitzer, Special Projects
Paul A. Tweedy, Administration

Technical areas include CAD/CAM, matrix applications in manufacturing, artificial intelligence/robotics, software engineering, computer networking, telecommunications, chemical and biotechnology, busines planning and management, and training.

The Technology Center, organized in 1988, has eight full-time employees, two FTE faculty members, student interns, and access to all University faculty for projects. The goal is to provide product, services and management enhancement services, technology transfer, and training to business and industry in northeastern Pennsylvania.

The center has a $7 million DoD grant, is an active participant in the Pennsylvania Industrial Resource Center and Ben Franklin Partnership programs, and contracts for direct services with business and industry on projects and training.

Publications include a prospectus and brochures.

Facilities: 10,000 sq ft laboratories

Facilities Total: 20,000 sq. ft. total

Center Number: 160

Technology Commercialization Center (TCC)
Media Services Building
Illinois State University
Normal, IL 61761-6901
309 438-7127

Organized: 1985

Host Organization
- Illinois State University
Sponsor(s)
- State of Illinois

Dr. Jerry Abner, Director

Technical areas include automated control, automated systems, personal robots, self-guided systems, and autonomous vehicles.

The center was established in 1985. The goal is promoting economic development within the community and providing learning experiences for graduate students. Staff includes a faculty pool of 27, student pool of 60, and five full-time professionals.

Funding of $1.3 million per year comes from the State of Illinois and industry.

Facilities: Research space

Facilities Total: 2,000 sq. ft.

Center Number: 161

Technology Development
Industrial Resource Center Program
Room 464
Forum Building
Harrisburg, PA 17120
717 787-4147

Sponsor(s)
- State of Pennsylvania

Jacques Koppell, Director

Molly Memmi, Staff
Chris Wakeley, Analyst

The IRC Network includes: Manufacturing Services Extension Center, Southwestern Pennsylvania Industrial Resource Center, Northwestern Pennsylvania IRC, Northeastern Pennsylvania IRC, Industrial Modernization Center, Delaware Valley IRC, COSTAR, MANTEC, and Bioprocessing Center.

The Industrial Resource Center Program provides services to small and medium sized manufacturing firms. Services include the development of manufacturing strategies, employee training, and new product introduction of manufacturing management and technology centers in Pennsylvania. The Office of Technology Development in the Pennsylvania Department of Commerce can provide contacts to the IRC network. The goal is to promote acceptance and adoption of automated manufacturing by industry to improve the overall competitiveness of Pennsylvania industry.

Funding by the Commonwealth of Pennsylvania is $30 million over 3 years.

Center Number: 162

Technology Service Center (TSC)
Department of Industrial Technology
118 Sill Hall
Eastern Michigan University
Ypsilanti, MI 48197
313 487-2259

Organized: 1982

Host Organization
- Eastern University

Charles L. Burrows, Director

Max Kanagi, Staff
Sandra Tanner, Administrative Assistant

Technical areas include vision, quality assurance, robotics, CNC, CADD/CAM, computer simulation of processes, polymers and coatings.

The center, organized in 1982, has eight to 12 full-time employees and 25 faculty members. Their goal is to provide training in manufacturing technology and on-site training and research services to industry.

The budget of $1 million per year is met with university generated, self-supported and industrial funding.

Brochure is available.

Facilities Total: 5,000 sq. ft.

Center Number: 163

Texas Center for Productivity and Quality of Work Life
College of Business Administration
Texas Tech University
P.O. Box 4320
Lubbock, TX 79409
806 742-1530

Organized: 1979

Host Organization
- Texas Tech University

Dr. Barry Macy, Director

Technical areas include CAD/CAM and robotics, management information systems, automated material handling, productivity measurement, human resources, labor/management relations, human factors, production operations management, integrated personnel systems, white collar productivity, and socio-technical systems. Recent major projects have included "greenfield" design and startup of a coal mine in South America, and the design and startup of a hi-tech manufacturing facility in Texas.

The center was established in 1979, with a formal charter and an independent Advisory Board composed of representatives from management, labor, state government, professional associations, and institutions of higher education. The goal of the center is to strengthen the State of Texas, Southwest, and United States private and public enterprise systems by creating, identifying, and supporting programs which improve organizational effectiveness, i.e., productivity, product/service quality and cost, and enhance employee's quality of work life.

The center's funding is distributed approximately 75% from grants and contracts, 5% from product sales, 10% from foundations, and 10% from the Texas legislature. Since 1980, funded research projects have totaled $1,785,000.

The center is a founding member of the United States National Productivity Network (NPN) and pursues its goals through reports that stress learning from the successes and failures in productivity improvement and work innovation in the private and public sectors.

Descriptive brochures are available.

Center Number: 164

TRACES: Training and Technology Transfer
750 Chase Parkway
Waterbury, CT 06708
203 575-0328

Organized: 1986

Host Organization
- Board of Trustees for Connnecticut State Technical Colleges

James M. Branciforte, Director

Patricia Lindsey, Assistant to the Director

Technical areas include: needs assessment, problem solving, information exchange, expert systems, industry training and curriculum development, facilities and equipment location. TRACES acts as a liaison between Connecticut business and industry, colleges, and state and federal agencies.

TRACES was organized in 1986. Its goal is to meet the technology related needs of business and industry through technology transfer, training, research and general assistance.

The organization works with five state technical colleges and is funded through the Board of Trustees.

Publications include general brochures, pamphlets and annual reports.

Washington Technical Center (WTC)
Mfg. Systems Tech. Program, Dept. of Mech. Eng.
University of Washington - Seattle
FU-10 UW
Seattle, WA 98195
206 543-5449

Organized: 1985

Host Organization
- University of Washington - Seattle
- Washington State - Pullman

Jens Jorgensen, Director

David U. Hutton, Associate Director

Technical areas include sensors and control systems, product processing, advanced materials, composites, intelligent systems - design planning and CIM, on-line sensing for improved productivity, vision systems, geometric modeling.

The center was organized in 1985. Its goal is computer integration of manufacturing from planning to product and basic research in sensing and modeling for relevant industry research. The organization consists of 20 faculty members from the University of Washington.

Sustaining funding is provided by trade and economical development in the amount of $300,000 annually. The annual budget is $1 million externally for a total of 1.5 million annually.

Publications include an annual report and prospectus.

Facilities: ME 3,000 sq ft, EE 1,500 sq ft, other 1,000 sq ft, for a total of 5,500 sq ft. Pullman 3,000 sq ft. New building will add 5,500 sq ft.

Facilities Total: Present 8,500 sq. ft.

Wisconsin Center for Manufacturing and Productivity (WCMP)
Dept. of Manufacturing and Systems Engineering
164 Engineering Building
University of Wisconsin - Madison
Madison, WI 53706
608 262-0921

Host Organization
- Marquette University
- Milwaukee Area Technical College
- Milwaukee School of Engineering
- University of Wisconsin - Madison
- University of Wisconsin - Milwaukee
- University of Wisconsin - Parkside
- University of Wisconsin - Platteville
- University of Wisconsin - Stout

Prof. Marvin DeVries, Director, WCMP

Dr. M. James Bensen, Dean, School of Indus and Tech, U of W - Stout
Dr. John C. Bollinger, Dean, Col of Eng. & Appl Sci., U of W - Milwaukee
Dr. Thomas W. Davies, VP, Academics, Milwaukee School of Engineering
Dr. Walter F. Feldt, Head, Eng. Sci. Div., U of W - Parkside
Dr. Ross F. McDonald, Dean, College of Eng., U of W - Platteville
Dr. Robert L. Reid, Dean, College of Eng., Marquette University
Dr. Carol J. Spencer, Dean, Indus & Tech Div., Milwaukee Area Tech. Col

Technical areas include CIM development, incremental motion control, robotics, flexible manufacturing, facility control, cell control, packaging, device control, manufacturing systems, thin-films, human factors, surface studies, and related areas.

The goal of WCMP is to foster education/industry partnerships through faculty exchanges, seminars and short courses, graduate and undergraduate degree programs, and basic and applied research in manufacturing technology. The WCMP provides a communications network and umbrella for Wisconsin's engineering colleges and programs, which pursue independent activities as well. Staffing includes access to over 700 faculty members in the subject areas at the eight host facilities.

Brochures describing WCMP and members are available from the respective organizations.

Center Number: 167

Wisconsin Manufacturing Automation and Robotics Consortium (MARC)
1513 University Avenue
Madison, WI 53706
608 262-5343

Organized: 1981

Host Organization
- University of Wisconsin - Madison

Neil A. Duffie, Director
Robert D. Lorenz, Director

John C. Bollinger, Staff
Marvin Devries, Staff

Technical areas include sensors, high performance control systems, robotic automation application, inspection integration, integrating data bases and CAD into manufacturing systems, space automation and robotics.

The center was organized in 1981. Its goal is to integrate sensors, actuators and data bases into manufacturing systems for industry and government. The organization consists of 53 faculty members, 50 to 60 graduate students and three advanced technical staff.

The center is funded by contracts, over $1 million, membership in consortium, $10,000, and is also somewhat self-supporting.

Publications include brochures and information samples.

Facilities: 5,000 sq ft simulation laboratory, modernized major facility

Facilities Total: 15,000 sq. ft.

Center Number: 168

Electronics Manufacturing Productivity Facility (EMPF)
NAVIRSA Detachment
1417 North Norma Street
Ridgecrest, CA 93555
619 446-7706 Fax: 619 446-6305

Organized: 1984

Host Organization
- NAVIRSA
- OP-43

Sponsor(s)
- U.S. Navy

Harold G. Peacock, Director

Mel Scott, Deputy Director, Operations
Debra Smith, Deputy Director, Publications

Kevin Carr, Head, Manufacturing Engineering Department
Ross Edward, Head, CCAPS Program Office
Kathryn Johnson, Head, Materials and Process Research Department
Tim Kertis, Head, Computer-Integrated Manufacturing Department

Manufacturing Engineering Research, the EMPF employs standardized assessment procedures and commercially available equipment to improve manufacturing processes. Materials and Process Research involves the analysis of those materials and process controls that affect overall manufacturing. The Circuit Card Assembly and Processing System Program Office examines the development of a modular and adaptable CCA manufacturing system. The use and integation of computer-aided workstations and software packages into the industry is the goal of the CIM department.

The EMPF is an independent government research center working with industry and academe to research, develop, and demonstrte high-quality manufacturing processes and materials. The EMPF has provided a forum for the exchange of eas since 1984. Results of its research are applied by the defe industry toward improving cost and quality in weapon systems manu .a .turing methods. Research is also coordinated with academe to integrate manufacturing science into engineering programs.

Although sponsored by the Navy, the EMPF has two industry advisory committees, consisting of top-level industry managers and scientists, who provide valuable counsel in support of the cooperative mission.

Communication with industry on the results of research comes in the form of technical documentation, publications, workshops and seminars.

Literature describing EMPF's activities in detail is available upon request.

Center Number: 169

Metal Matrix Composites Information Analysis Center (MMCIAC)
Kaman Tempo
816 State Street
P.O. Drawer QQ
Santa Barbara, CA 93102-1479
805 963-6455

Organized: 1980

Host Organization
- Kaman Tempo
Sponsor(s)
- Defense Logistics Agency

David Reitz, Director

Sara Ellingwood, Librarian

Joan Champeny, Staff
Rob Mahoney, Staff

The Center performs materials comparison studies; applications technology analysis; static and dynamic materials properties and behavior analyses; test method analyses and evaluations; market analyses, and design, performance, and optimization analysis. It supplies materials properties data and provides information on fabrication processes, defense system and other applications, cost, operational serviceability and repair, environmental protection, survivability, sources and suppliers, and current research and development.

Started in 1980 the broad mission of MMCIAC is to provide scientific and technical information analysis service to the DoD, other government agencies, govenment contractors, and the private sector in the area of metal matrix composite materials.

The center receives funding through the Defense Logistics Agency.

MMCIAC produces state of the art and data reviews, technology assessments, technical papers, directories, conference proceedings, patent catalogs, comprehensive literature searches and a quarterly newsletter.

Center Number: 174

Advanced Manufacturing Center
Cleveland State University
1751 East 23rd Street
Cleveland, OH 44114
216 687-4565

Organized: 1984

Host Organization
- Cleveland State University
Sponsor(s)
- Cleveland Advanced Manufacturing Program; Ohio Edison Program; State of Ohio

Arthur Thompson, Director Emeritas

Pieter Von Herrman, Director

I.R. Kacir, Staff

Technical areas include structural dynamics/machine health monitoring, computer simulation of forging and extrusion processes, mechano-optics, laser optics, tribology and wear testing, waterjet cutting.

The AMC began in 1984. The primary purpose of the center is to make Ohio and midwest industry more competitive. The organization consists of 12 faculty, 4 technical and 20 graduate students.

Support is provided by the Ohio Edison Program-Cleveland Advanced Manufacturing Program - $400K; state - $150K; members - $600-800K.

Publications include brochures and progress reports.

Plastics Joining Center
Edison Welding Institute
1100 Kinnear Road
Columbus, OH 43212
614 486-9400

Organized: 1989

Host Organization
- Edison Welding Institute

Bob Grimm, Section Manager
Bob Rivett, Department Manager
Bob Sliff, Section Manager

Technical areas include technology for joining plastics, solvent, technology transfer, and application development.

The Plastics Joining Center was organized in 1989. The primary purpose of the center is to advance composite fastening technology for industry. The organization consists of 9 on-site staff and 50 faculty.

Support is provided through industry.

Publications include a prospectus and brochure.

Facilities: Clean labs.

Facilities Total: 1200 sq. ft.

Edison Welding Institute
1100 Kinnear Road
Columbus, OH 43212
614 486-9400

Organized: 1984

Host Organization
- Edison Welding Institute
Sponsor(s)
- State of Ohio

Karl Graff, Director

Bob Rivett, Manager

Jeff Booth, Staff
Harvey Castener, Staff
John Lippolo, Staff

Technical areas include joining, welding,d esign properties, nondestructive testing, brazing, adhesives, soldering and lasers.

The Institute began in 1984. The primary purpose of the institute is to advance welding research. The organization consists of 20 staff, 25 engineers, and 45 technicians.

Support is provided through membership subscription, simple and multisponsored contracts, and the State of Ohio.

Publications include a brochure and reports.

Facilities: 15,000 sq. ft. conventional and 6 clean labs.

Facilities Total: 45,000 sq. ft.

ORDER FORM

The Directory of Manufacturing Research Centers includes information on over 160 research centers throughout the United States. Each entry includes a description of the center's technical areas, mission statement, goals, facilities and publications. Information is also included on funding, staff, and affiliated organizations. The Directory is available in the following formats:

1. Hard Copy - The printed version of the Directory is 180+ pages, spiral bound. Indexes are by State, Affiliation, Personal Names, Center Names, and Keyword.

   Cost: $75.00

2. ASCII File - This version of the Directory is available on:

   2 low-density 5-1/4 inch disks
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Cost: $75.00

3. On-Line - The Directory is searchable on-line through MTIAC On-Line Services. The data base is updated on a continuing basis and is available only to members of MTIAC. Information on becoming a member of MTIAC will be furnished on request.

   . $60.00 per connect hour

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SEND TO: Manufacturing Technology Information Analysis Center
10 West 35th Street
Chicago, IL 60616
(312) 567-4730

MTIAC
A DoD Information Analysis Center

Directory of Manufacturing Research Centers Date: June 1989

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1. Name

2. Organization

3. Job Title

4. Field of Specialization

5. Please evaluate this publication (Check off one or more as applicable).

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Information relevant	Use it often
Information outdated	Hardly use it
Information timely	Overall very useful to my job
Information technically excellent	Overall not very useful to my job
Information technically satisfactory	Got my money's worth
Information technically unsatisfactory	Did not get my money's worth
Easy to use	Other_____

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